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IDENTIFICATION

PRODUCT CODE: AC-T549A-MC
 PRODUCT NAME: CZVSVA0 COLOUR LOOKUP OPTION
 PRODUCT DATE: 16-MARCH-1983
 MAINTAINER: C.S.S. READING U.K.
 AUTHOR: PAUL TAYLOR
 HISTORY: MODIFIED FROM Z185F.MAC

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1.0 GENERAL INFORMATION

1.1 PROGRAM ABSTRACT

THIS PROGRAM CHECKS THE FUNCTIONALITY OF THE VSV11/VS11 COLOR LOOK-UP TABLE. THE PROGRAM IS SPLIT UP INTO THREE TESTS AS FOLLOWS:-

- TEST 1. LOGIC TESTS
- TEST 2. MAINTENANCE REGISTER READ/WRITE TEST
- TEST 3. ANALOG VERIFICATION TESTS
- TEST 4. BAR/DOT GENERATION (STAND ALONE)

THIS DIAGNOSTIC HAS BEEN WRITTEN FOR USE WITH THE DIAGNOSTIC RUNTIME SERVICES SOFTWARE (SUPERVISOR). THESE SERVICES PROVIDE THE INTERFACE TO THE OPERATOR AND TO THE SOFTWARE ENVIRONMENT. THIS PROGRAM CAN BE USED WITH XXDP+, ACT, APT, SLIDE AND PAPER TAPE. FOR A COMPLETE DESCRIPTION OF THE RUNTIME SERVICES, REFER TO THE XXDP+ USER'S MANUAL. THERE IS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES IN SECTION 2 OF THIS DOCUMENT.

1.2 SYSTEM REQUIREMENTS

- A. PDP-11 PROCESSOR WITH 24K OR MORE OF MEMORY
- B. CONSOLE TERMINAL WITH INTERFACE ADDRESS 777560
- C. XXDP+ SUPPORTED LOAD DEVICE OR PAPER TAPE SUPERVISOR
- D. VSV11/VS11
- E. COLOR DISPLAY MONITOR OR B/W MONITOR

1.3 RELATED DOCUMENTS AND STANDARDS

XXDP+ USERS MANUAL CHQUS

1.4 DIAGNOSTIC HIERARCY PREREQUISITES

BEFORE RUNNING THIS DIAGNOSTIC THE VSV11/VS11 SHOULD BE CHECKED USING ITS RELEVANT DIAGNOSTICS

1.5 ASSUMPTIONS

TO GET THE FULL 256 COLOR DISPLAY, THE VSV11/VS11 WILL NEED TO BE CONFIGURED USING TWO MEMORY PLANES NON-INTERLACED OR FOUR MEMORY PLANES INTERLACED.

2.0 OPERATING INSTRUCTIONS

THIS SECTION CONTAINS A BRIEF DESCRIPTION OF THE RUNTIME SERVICES. FOR DETAILED INFORMATION, REFER TO THE XXDP+ USER'S MANUAL (CHQUS).

2.1 COMMANDS

THERE ARE ELEVEN LEGAL COMMANDS FOR THE DIAGNOSTIC RUNTIME SERVICES (SUPERVISOR). THIS SECTION LISTS THE COMMANDS AND GIVES A VERY BRIEF DESCRIPTION OF THEM. THE XXDP+ USER'S MANUAL HAS MORE DETAILS.

COMMAND	EFFECT
---------	--------

138	-----	-----
139	START	START THE DIAGNOSTIC FROM AN INITIAL STATE
140	RESTART	START THE DIAGNOSTIC WITHOUT INITIALIZING
141	CONTINUE	CONTINUE AT TEST THAT WAS INTERRUPTED (AFTER ^C)
142	PROCEED	CONTINUE FROM AN ERROR HALT
143	EXIT	RETURN TO XXDP+ MONITOR (XXDP+ OPERATION ONLY!)
144	ADD	ACTIVATE A UNIT FOR TESTING (ALL UNITS ARE
145		CONSIDERED TO BE ACTIVE AT START TIME
146	DROP	DEACTIVATE A UNIT
147	PRINT	PRINT STATISTICAL INFORMATION (IF IMPLEMENTED
148		BY THE DIAGNOSTIC - SECTION 4.0)
149	DISPLAY	TYPE A LIST OF ALL DEVICE INFORMATION
150	FLAGS	TYPE THE STATE OF ALL FLAGS (SEE SECTION 2.3)
151	ZFLAGS	CLEAR ALL FLAGS (SEE SECTION 2.3)

A COMMAND CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. SO YOU MAY, FOR EXAMPLE, TYPE "STA" INSTEAD OF "START".

2.2 SWITCHES

THERE ARE SEVERAL SWITCHES WHICH ARE USED TO MODIFY SUPERVISOR OPERATION. THESE SWITCHES ARE APPENDED TO THE LEGAL COMMANDS. ALL OF THE LEGAL SWITCHES ARE TABULATED BELOW WITH A BRIEF DESCRIPTION OF EACH. IN THE DESCRIPTIONS BELOW, A DECIMAL NUMBER IS DESIGNATED BY "DDDD".

SWITCH	EFFECT
-----	-----
/TESTS:LIST	EXECUTE ONLY THOSE TESTS SPECIFIED IN THE LIST. LIST IS A STRING OF TEST NUMBERS, FOR EXAMPLE - /TESTS:1:5:7-10. THIS LIST WILL CAUSE TESTS 1,5,7,8,9,10 TO BE RUN. ALL OTHER TESTS WILL NOT BE RUN.
/PASS:DDDD	EXECUTE DDDDD PASSES (DDDD = 1 TO 64000)
/FLAGS:FLGS	SET SPECIFIED FLAGS. FLAGS ARE DESCRIBED IN SECTION 2.3.
/EOP:DDDD	REPORT END OF PASS MESSAGE AFTER EVERY DDDDD PASSES ONLY. (DDDD = 1 TO 64000)
/UNITS:LIST	TEST/ADD/DROP ONLY THOSE UNITS SPECIFIED IN THE LIST. LIST EXAMPLE - /UNITS:0:5:10-12 USE UNITS 0,5,10,11,12 (UNIT NUMBERS = 0-63)

EXAMPLE OF SWITCH USAGE:

START/TESTS:1-5/PASS:1000/EOP:100

THE EFFECT OF THIS COMMAND WILL BE: 1) TESTS 1 THROUGH 5 WILL BE EXECUTED, 2) ALL UNITS WILL TESTED 1000 TIMES AND 3) THE END OF PASS MESSAGES WILL BE PRINTED AFTER EACH 100 PASSES ONLY. A SWITCH CAN BE RECOGNIZED BY THE FIRST THREE CHARACTERS. YOU MAY, FOR EXAMPLE, TYPE "/TES:1-5" INSTEAD OF "/TESTS:1-5".

BELOW IS A TABLE THAT SPECIFIES WHICH SWITCHES CAN BE USED BY EACH COMMAND.

	TESTS	PASS	FLAGS	EOP	UNITS
	-----	-----	-----	-----	-----
START	X	X	X	X	X

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195 RESTART X X X X X
196 CONTINUE X X X X
197 PROCEED X
198 DROP X
199 ADD X
200 PRINT X
201 DISPLAY X
202 FLAGS
203 ZFLAGS
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2.3 FLAGS

FLAGS ARE USED TO SET UP CERTAIN OPERATIONAL PARAMETERS SUCH AS LOOPING ON ERROR. ALL FLAGS ARE CLEARED AT STARTUP AND REMAIN CLEARED UNTIL EXPLICITLY SET USING THE FLAGS SWITCH. FLAGS ARE ALSO CLEARED AFTER A START COMMAND UNLESS SET USING THE FLAG SWITCH. THE ZFLAGS COMMAND MAY ALSO BE USED TO CLEAR ALL FLAGS. WITH THE EXCEPTION OF THE START AND ZFLAGS COMMANDS, NO COMMANDS AFFECT THE STATE OF THE FLAGS; THEY REMAIN SET OR CLEARED AS SPECIFIED BY THE LAST FLAG SWITCH.

FLAG	EFFECT
HOE	HALT ON ERROR - CONTROL IS RETURNED TO RUNTIME SERVICES COMMAND MODE
LOE	LOOP ON ERROR
IER*	INHIBIT ALL ERROR REPORTS
IBR*	INHIBIT ALL ERROR REPORTS EXCEPT FIRST LEVEL (FIRST LEVEL CONTAINS ERROR TYPE, NUMBER, PC, TEST AND UNIT)
IXR*	INHIBIT EXTENDED ERROR REPORTS (THOSE CALLED BY PRINTX MACRO'S)
PRI	DIRECT MESSAGES TO LINE PRINTER
PNT	PRINT TEST NUMBER AS TEST EXECUTES
BOE	"BELL" ON ERROR
UAM	UNATTENDED MODE (NO MANUAL INTERVENTION)
ISR	INHIBIT STATISTICAL REPORTS (DOES NOT APPLY TO DIAGNOSTICS WHICH DO NOT SUPPORT STATISTICAL REPORTING)
IDR	INHIBIT PROGRAM DROPPING OF UNITS
ADR	EXECUTE AUTODROP CODE
LOT	LOOP ON TEST
EVL	EXECUTE EVALUATION (ON DIAGNOSTICS WHICH HAVE EVALUATION SUPPORT)

*ERROR MESSAGES ARE DESCRIBED IN SECTION 3.1

SEE THE XXDP+ USER'S MANUAL FOR MORE DETAILS ON FLAGS. YOU MAY SPECIFY MORE THAN ONE FLAG WITH THE FLAG SWITCH. FOR EXAMPLE, TO CAUSE THE PROGRAM TO LOOP ON ERROR, INHIBIT ERROR REPORTS AND TYPE A "BELL" ON ERROR, YOU MAY USE THE FOLLOWING STRING:

/FLAGS:LOE:IER:BOE

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2.4 HARDWARE QUESTIONS

WHEN A DIAGNOSTIC IS STARTED, THE RUNTIME SERVICES WILL PROMPT THE USER FOR HARDWARE INFORMATION BY TYPING "CHANGE HW (L) ?" YOU MUST ANSWER "Y" AFTER A START COMMAND UNLESS THE HARDWARE INFORMATION HAS BEEN "PRELOADED" USING THE SETUP UTILITY (SEE CHAPTER 6 OF THE XXDP+ USER'S MANUAL). WHEN YOU ANSWER THIS QUESTION WITH A "Y", THE RUNTIME SERVICES WILL ASK FOR THE NUMBER OF UNITS (IN DECIMAL). YOU WILL THEN BE ASKED THE FOLLOWING QUESTIONS FOR EACH UNIT.

#UNITS (D) ?

TYPE IN THE NUMBER OF VS11/COLOR LOOKUP TABLE COMBINATIONS ON THE SYSTEM.

UNIT 0
LUT CSR ADDRESS (O) 172020 ?

TYPE <CR> TO US DEFAULT ADDRESS FOR FIRST DEVICE
OR TYPE IN CORRECT CSR ADDRESS <CR>.
THIS SHOULD BE AN OCTAL NUMBER IN RANGE 160000-177776

LUT INTERRUPT VECTOR(O) 340 ?

TYPE <CR> OR CORRECT VECTOR ADDRESS <CR>
THIS SHOULD BE AN OCTAL NUMBER IN RANGE 000-377

INTERRUPT PRIORITY (O) 4 ?

TYPE <CR> OR CORRECT PRIORITY LEVEL <CR>

VS11 1ST BUS ADDRESS (O) 172010 ?

TYPE <CR> OR CORRECT ADDRESS <CR>

VS11 INTERRUPT VECTOR (O) 320 ?

TYPE <CR> OR CORRECT VECTOR <CR>

IF MORE THAN ONE UNIT IS TO BE TESTED, THE RUNTIME SERVICES WILL PROMPT FOR THE ABOVE INFORMATION FOR EACH SUBSEQUENT UNIT.

2.5 SOFTWARE QUESTIONS

AFTER YOU HAVE ANSWERED THE HARDWARE QUESTIONS OR AFTER A RESTART OR CONTINUE COMMAND, THE RUNTIME SERVICES WILL ASK FOR SOFTWARE PARAMETERS. THESE PARAMETERS WILL GOVERN SOME DIAGNOSTIC SPECIFIC OPERATION MODES. YOU WILL BE PROMPTED BY "CHANGE SW (L) ?" IF YOU WISH TO CHANGE ANY PARAMETERS, ANSWER BY TYPING "Y". THE SOFTWARE QUESTIONS AND THE DEFAULT VALUES ARE DESCRIBED IN THE NEXT PARAGRAPH(S).

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TOLERANCE TESTING REQUIRED ?
ANSWER Y(ES) FOR TOLLERANCE N(O) FOR GO-NOGO TEST (L) Y ?

TEST 3 OF THE DIAGNOSTIC CHECKS ANALOG OUTPUTS OF RED, GREEN, BLUE AND COMPOSIT VIDEO AGAINST AN EXPECTED VALUE FOR DIFFERENT INPUTS. THE GO-NOGO TEST WILL ONLY ENSURE THAT THE ANALOG VALUES CROSS OVER ALL THE THRESHOLDS WHEREAS THE TOLERANCE TEST ENSURES THAT THE REFERANCE THRESHOLDS ARE EXCEEDED WITH THE CORRECT LEVEL OF INPUT THE NORMAL DEFAULT TO THIS QUESTION IS Y(ES) TO FULLY TEST THE COLOR L.U.T. ANALOG OUTPUT CIRCUITS.

2.6 QUICK START-UP PROCEDURE (XXDP+)

TO START-UP THIS PROGRAM:

1. BOOT XXDP+
2. GIVE THE DATE AND ANSWER THE LSI AND 50HZ (IF THERE IS A CLOCK) QUESTIONS
3. TYPE 'R NAME', WHERE NAME IS THE NAME OF THE BIN OR BIC FILE FOR THIS PROGRAM
4. TYPE "START"
5. ANSWER THE "CHANGE HW" QUESTION WITH "Y"
6. ANSWER ALL THE HARDWARE QUESTIONS
7. ANSWER THE "CHANGE SW" QUESTION WITH "N"

WHEN YOU FOLLOW THIS PROCEDURE YOU WILL BE USING ONLY THE DEFAULTS FOR FLAGS AND SOFTWARE PARAMETERS. THESE DEFAULTS ARE DESCRIBED IN SECTIONS 2.3 AND 2.5.

3.0 ERROR INFORMATION

3.1 TYPES OF ERROR MESSAGES

THERE ARE THREE LEVELS OF ERROR MESSAGES THAT MAY BE ISSUED BY A DIAGNOSTIC: GENERAL, BASIC AND EXTENDED. GENERAL ERROR MESSAGES ARE ALWAYS PRINTED UNLESS THE "IER" FLAG IS SET (SECTION 2.3). THE GENERAL ERROR MESSAGE IS OF THE FORM:

```
NAME TYPE NUMBER ON UNIT NUMBER TST NUMBER PC:XXXXXX
ERROR MESSAGE
```

WHERE: NAME = DIAGNOSTIC NAME
TYPE = ERROR TYPE (SYS FATAL, DEV FATAL, HARD OR SOFT)
NUMBER = ERROR NUMBER
UNIT NUMBER = 0 - N (N IS LAST UNIT IN PTABLE)
TST NUMBER = TEST AND SUBTEST WHERE ERROR OCCURRED
PC:XXXXXX = ADDRESS OF ERROR MESSAGE CALL

BASIC ERROR MESSAGES ARE MESSAGES THAT CONTAIN SOME ADDITIONAL INFORMATION ABOUT THE ERROR. THESE ARE ALWAYS PRINTED UNLESS THE "IER" OR "IBR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES

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ARE PRINTED AFTER THE ASSOCIATED GENERAL MESSAGE.

EXTENDED ERROR MESSAGES CONTAIN SUPPLEMENTARY ERROR INFORMATION SUCH AS REGISTER CONTENTS OR GOOD/BAD DATA. THESE ARE ALWAYS PRINTED UNLESS THE "IER", "IBR" OR "IXR" FLAGS ARE SET (SECTION 2.3). THESE MESSAGES ARE PRINTED AFTER THE ASSOCIATED GENERAL ERROR MESSAGE AND ANY ASSOCIATED BASIC ERROR MESSAGES.

3.2 SPECIFIC ERROR MESSAGES

- 00000 UNEXPECTED DISPLAY PROCESSOR UNIT TIME-OUT.
- 00001 NON-EXISTANT DEVICE ADDRESS
ADDRESS: NNNNNN
- 00101 LUT READ INTERRUPT EXPECTED, NOT RECEIVED.
- 00102 LUT WRITE INTERRUPT EXPECTED, NOT RECEIVED.
- 00103 UNEXPECTED LUT READ INTERRUPT
- 00104 UNEXPECTED LUT WRITE INTERRUPT
- 00105 LUT AUTO-INCREMENT INCORRECT ON READ
- 00106 LUT AUTO-INCREMENT INCORRECT ON WRITE
- 00107 LUT DATA INCORRECT (AFTER CLEAR SET FUNCTION)
CSR NNNNNN EXP'D NNNNNN REC'D NNNNNN
- 00108 LUT DATA INCORRECT (AFTER LOADING GREYSCALE TABLE)
CSR NNNNNN EXP'D NNNNNN REC'D NNNNNN
- 00201 LUT MAINTENANCE REGISTER READ/WRITE ERROR.
MAINT REG NNNNNN EXP'D NNNNNN REC'D NNNNNN
- 00301 XXX DATA ERROR
INPUT REQUIRED TO EXCEED THRESHOLD INCORRECT
GAMMA CORRECTION IS ZZ
THRESHOLD: 0.07V 0.42V 1.00V 1.35V
EXPECTED: NNNN NNNN NNNN NNNN
RECEIVED: NNNN NNNN NNNN NNNN

WHERE XXX = RED, GREEN, BLUE OR COMPOSITE
ZZ = 'ON' OR 'OFF'
NNNN = OCTAL NUMBER
- 00302 XXX DAC ERROR
FAILED TO CROSS ALL MAINTENANCE THRESHOLDS
GAMMA CORRECTION IS ZZ
THRESHOLD: 0.07V 0.42V 1.00V 1.35V
EXPECTED: NNNN NNNN NNNN NNNN
RECEIVED: NNNN NNNN NNNN NNNN

ERROR REPORT 301 IS USED IF ANSWER TO SOFTWARE QUESTION IS 'Y' TOLERANCE TESTING
ERROR 302 IS USED IF ANSWER IS 'N' GO-NOGO TEST

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4.0 PERFORMANCE AND PROGRESS REPORTS

AT THE END OF EACH PASS, THE PASS COUNT IS GIVEN ALONG WITH THE TOTAL NUMBER OF ERRORS REPORTED SINCE THE DIAGNOSTIC WAS STARTED. THE 'EOP' SWITCH CAN BE USED TO CONTROL HOW OFTEN THE END OF PASS MESSAGE IS PRINTED. SECTION 2.2 DESCRIBES SWITCHES.

5.0 DEVICE INFORMATION TABLES

THE HARDWARE TABLE CREATED AT STARTUP CONTAINS FIVE WORD ENTRIES FOR EACH DEVICE UNDER TEST. THESE ARE AS FOLLOWS:-

1. LUT CSR ADDRESS
2. LUT INTERRUPT VECTOR
3. INTERRUPT PRIORITY
4. VS11 FIRST BUS ADDRESS
5. VS11 INTERRUPT VECTOR

AT THE BEGINNING OF EACH PASS, THE RELEVANT ADDRESSES FOR THE DEVICE UNDER TEST ARE SET UP IN THE 'GLOBAL DATA' SECTION OF THE PROGRAM

6.0 TEST SUMMARIES

THE PROGRAM CONSISTS OF FOUR TESTS WITH THE FOURTH TEST BEING A STAND ALONE "COLOR BAR / CROSS HATCH / DOTS" GENERATOR PROGRAM. TEST 4 CAN ONLY BE ENTERED AS FOLLOWS:-

DR> STA/TEST:4 <CR> OR RES/TEST:4 <CR>

TO RUN THE NON-INTERVENTION TESTS (TEST 1, TEST 2 AND TEST 3) TYPE STA <CR> AFTER THE DR> PROMPT.

6.1 TEST DESCRIPTION

TEST 1. LOOK-UP TABLE LOGIC TEST

THIS TEST IS DEVIDED INTO SUBTESTS AND TESTS THE FOLLOWING FUNCTIONS:-

INTERRUPT ON READ
INTERRUPT ON WRITE
UNEXPECTED READ INTERRUPT
UNEXPECTED WRITE INTERRUPT

THE ABOVE TESTS ARE REPEATED 40 TIMES.

SUBTEST 1.1 LUT AUTO-INCREMENTS CORRECTLY ON READ
 LUT AUTO-INCREMENTS CORRECTLY ON WRITE

SUBTEST 1.2 CLEAR SET FUNCTION WORKS CORRECTLY

SUBTEST 1.3 LUT MEMORY CAN BE WRITTEN AND READ BACK CORRECTLY

TEST 2. MAINTENANCE REGISTER READ/WRITE TEST

TEST 3. ANALOG VERIFICATION.

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THIS TEST CHECKS THE RED, GREEN, BLUE AND COMPOSITE VIDEO D.A.C. OUTPUTS AGAINST SET VALUES USING THE MAINTENANCE REGISTER. EACH D.A.C. IS CHECKED TWICE. ONCE WITH GAMMA CORRECTION ENABLED AND ONCE WITH GAMMA CORRECTION OFF. IF "TOLERANCE" TESTING IS SELECTED, THE THRESHOLD CROSS-OVER POINTS ARE CHECKED AGAINST THE EXPECTED CROSS-OVER POINTS. IF "GO-NOGO" TESTING IS SELECTED, CHECKS ARE ONLY MADE TO SEE IF ALL FOUR THRESHOLDS ARE EXCEEDED.

TESTS 1 2 AND 3 CAN BE RUN WITHOUT ANY VIDEO MONITOR AS TESTING IS DONE VIA THE MAINTENANCE REGISTER.

TEST 4. BAR-DOT GENERATOR (STAND ALONE)

THIS TEST IS ONLY ENTERED WITH THE COMMANDS
STA/TEST:4 <CR> OR RES/TEST:4 <CR>

ONCE ENTERED, THE ONLY EXIT IS BY <^C>

THE FOLLOWING KEYBOARD INPUTS CAN BE USED TO CHANGE THE DISPLAY:-

A <CR> = ALTERNATE
B <CR> = BARS
C <CR> = 7 X 7 CROSS-HATCH
D <CR> = 7 X 7 DOT ARRAY
E <CR> = ENABLE GAMMA CORRECTION
G <CR> = GAMMA CORRECTION OFF

THE TEST IS INITIATED WITH AN 8 COLOR BAR DISPLAY. BY REPEATEDLY HITTING THE A <CR> KEYS THE DISPLAY CAN BE MADE TO CYCLE ROUND THE FOLLOWING TEST PATTERNS:-

16 COLOR BAR RAINBOW
64 COLOR BARS
256 GREYSCALE (FOR BLACK AND WHITE MONITOR)
16 SHADES OF COLOR 1
THROUGH
16 SHADES OF COLOR 7

IF THE "C" OR "D" KEY IS HIT AND THEN "ALTERNATED" THE CROSS-HATCH OR DOTS WILL CHANGE THROUGH THE COLORS RED, GREEN, BLUE, WHITE.

GAMMA CORRECTION COMPENSATES FOR THE NON-LINEARITY OF CRT PHOSPHORES BY INCREASING THE AMPLITUDE OF LOW INTENSITY COLORS.

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.NLIST TOC,ME,CND,MEB

ONEFILE=1

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542      .SBTTL  PROGRAM HEADER
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544      :XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
545      .MCALL  SVC
546 000000      SVC          ; INITIALIZE SUPERVISOR MACROS
547
548      SVCGBL= 1          ; DON'T LIST GLOBAL TAGS AT RIGHT MARGIN.
549      SVCTST= 1          ;          DITTO  TEST TAGS.
550      SVCSUB= 1          ;          DITTO  SUBTEST TAGS.
551      SVCTAG= 1          ;          DITTO  ANY OTHER TAGS.
552      SVCINS= 1          ;          DITTO  INSTRUCTIONS AND DATA.
553
554      : THESE SYMBOLS CONTROL THE LISTING FIELD OF ALL SVC MACRO
555      : EXPANSIONS. YOU MAY CHANGE THEM AT ANY TIME OR PLACE.
556
557      :          1 = RIGHT-JUSTIFY (MAKES IT EASY TO DISTINGUISH
558      :          SVC'S MACRO CODE FROM YOUR OWN).
559      :          0 = LEFT-JUSTIFY (ALIGN IN A NORMAL FASHION).
560      :          -1 = DON'T LIST THE EXPANSIONS AT ALL.
561      :XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
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563 000000      .ENABL  ABS,AMA
564      002000      .=      2000
565
566      :++
567      : THE PROGRAM HEADER IS THE INTERFACE BETWEEN
568      : THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
569      :--
570      SVCGBL= 0          ; ALIGN THE HEADER STUFF.
571      SVCINS= 0
572
573 002000      POINTER BGNSW,BGNSFT,BGNDU,BGNAU,ERRTBL
574 002000      HEADER  CZVSV,A,0,20,0,PRI07
575 002000      L$NAME::          ;DIAGNOSTIC NAME
576 002000      .ASCII  /C/
577 002001      .ASCII  /Z/
578 002002      .ASCII  /V/
579 002003      .ASCII  /S/
580 002004      .ASCII  /V/
581 002005      .BYTE   0
582 002006      .BYTE   0
583 002007      .BYTE   0
584 002010      L$REV::          ;REVISION LEVEL
585 002010      .ASCII  /A/
586 002011      L$DEPO::        ;0
587 002011      .ASCII  /0/
588 002012      L$UNIT::        ;NUMBER OF UNITS
589 002012      .WORD   0
590 002014      L$TIML::        ;LONGEST TEST TIME
591 002014      .WORD   20
592 002016      L$HPCP::        ;PTR. TO H.W. QUES.
593 002016      .WORD   L$HARD
594 002020      L$SPCP::        ;PTR. TO S.W. QUES.
595 002020      .WORD   L$SOFT
596 002022      L$HPTP::        ;PTR. TO DEF. H.W. PTABLE
597 002022      .WORD   L$HW
598 002024      L$SPTP::        ;PTR. TO S.W. PTABLE

```

CZVSVAO COLOUR LOOKUP OPTION
PROGRAM HEADER

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002024	002516	L\$LADP::	.WORD	L\$SW	;DIAG. END ADDRESS
002026		L\$STA::	.WORD	L\$LAST	;RESERVED FOR APT STATS
002026	015004	L\$CO::	.WORD	0	
002030	000000	L\$DTYP::	.WORD	0	;DIAGNOSTIC TYPE
002032	000000	L\$APT::	.WORD	0	;APT EXPANSION
002032	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002034	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002036	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002040	013016	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002042	000340	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002044	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002044	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002046	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002046	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002050	003	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002050	003	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002051	003	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002052		L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002052	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002054	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002056	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002056	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002060	002156	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002062	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002062	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002064	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002064	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002066	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002066	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002070	006422	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002070	006422	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002072	006326	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002072	006326	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002074	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002074	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002076	002122	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002076	002122	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002100	104035	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002100	104035	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002102	003222	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002102	003222	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002104	005652	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002104	005652	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002106	006504	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002106	006504	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002110	006324	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002110	006324	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002112	006316	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002112	006316	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002114	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE
002114	000000	L\$DTP::	.WORD	0	;PTR. TO DISPATCH TABLE

CZVSVAO COLOUR LOOKUP OPTION
PROGRAM HEADER

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002116			
002116	000000		
002120			
002120	000000		
575 002122			
002122			
002122	052	052	052
002125	052	040	126
002130	123	050	126
002133	051	061	061
002136	055	114	125
002141	040	124	105
002144	123	124	123
002147	040	052	052
002152	052	052	000

```

L$DLY::          ;DELAY COUNT
                .WORD 0
L$HIME::         ;PTR. TO HIGH MEM
                .WORD 0
                DESCRIPT <**** VS(V)11-LU TESTS ****>
L$DESC::         .ASCIZ /**** VS(V)11-LU TESTS ****/
    
```

576 002156			
002156			
002156	126	123	050
002161	126	051	061
002164	061	040	127
002167	111	124	110
002172	040	114	117
002175	117	113	055
002200	125	120	055
002203	124	101	102
002206	114	105	040
002211	117	120	124
002214	111	117	116
002217	000		

```

                .EVEN
                DEVTYP <VS(V)11 WITH LOOK-UP-TABLE OPTION>
L$DVTYP::       .ASCIZ /VS(V)11 WITH LOOK-UP-TABLE OPTION/
    
```

577	
578	177777
579	177777
580	177777
581	177777
582	177777

```

                .EVEN
SVCGBL= -1      ; DON'T LIST GLOBAL TAGS AT RIGHT MARGIN.
SVCTST= -1     ; DITTO TEST TAGS.
SVCSUB= -1     ; DITTO SUBTEST TAGS.
SVCTAG= -1     ; DITTO ANY OTHER TAGS.
SVCINS= -1     ; DITTO INSTRUCTIONS AND DATA.
    
```

CZVSVA0 COLOUR LOOKUP OPTION
DEFAULT HARDWARE P-TABLE

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584
585
586
587
588
589
590
591 002220
592
593 002222 172020
594 002224 000340
595 002226 000200
596 002230 172010
597 002232 000320
598 002234

.SBTTL DEFAULT HARDWARE P-TABLE

:++
: THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
: THE TEST-DEVICE PARAMETERS. THE STRUCTURE OF THIS TABLE
: IS IDENTICAL TO THE STRUCTURE OF THE RUN-TIME P-TABLE.
:--

BGNHW	DFPTBL	:DEFAULT HARD-P-TABLE
.WORD	172020	: LUT CSR ADDRESS.
.WORD	340	: INTERRUPT VECTOR...
.WORD	PRI04	: ...AND PRIORITY.
.WORD	172010	: VS11 FIRST BUS ADDRESS
.WORD	320	: FIRST INTERRUPT VECTOR
ENDHW		


```

600          .SBTTL  HARDWARE PARAMETER CODING SECTION
601
602          :++
603          : THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
604          : THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
605          : MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
606          : INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
607          : MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
608          : WITH THE OPERATOR.
609          :--
610 002234          BGNHRD
611
612 002236          GPRMA  M1,0,0,160000,177776,YES ; GET CSR ADDRESS.
613 002246          GPRMA  M2,2,0,0,776,YES       ; GET VECTOR ADDRESS.
614 002256          GPRMD  M3,4,0,340,0,7,YES     ; GET PRIORITY.
615 002270          GPRMA  M4,6,0,160000,177776,YES ; GET VS11 1ST BUS ADDRESS
616 002300          GPRMA  M5,10,0,0,776,YES      ; GET VS11 INTERRUPT VECTOR ADD
617 002310          EXIT HRD
618 002312          M1:   .ASCIZ  /VS(V)11-LU CSR ADDRESS..../
        002315          126     123     050
        002320          126     051     061
        002323          061     055     114
        002326          125     040     103
        002331          123     122     040
        002334          101     104     104
        002337          122     105     123
        002342          123     056     056
        002345          056     056     000
619 002345          M2:   .ASCIZ  /VS(V)11-LU INTERRUPT VECTOR/
        002350          126     123     050
        002353          126     051     061
        002356          061     055     114
        002361          125     040     111
        002364          116     124     105
        002367          122     122     125
        002372          120     124     040
        002375          126     105     103
        002400          124     117     122
        002401          000
620 002401          M3:   .ASCIZ  /INTERRUPT PRIORITY../
        002404          111     116     124
        002407          105     122     122
        002412          125     120     124
        002415          040     120     122
        002420          111     117     122
        002423          111     124     131
        002426          056     056     000
621 002426          M4:   .ASCIZ  /VS(V)11 1ST BUS ADDRESS.../
        002431          126     123     050
        002434          126     051     061
        002437          061     040     061
        002442          123     124     040
        002445          102     125     123
        002450          040     101     104
        002453          104     122     105
        002456          123     123     056
622 002461          M5:   .ASCII  /VS(V)11 INTERRUPT VECTOR../
        002464          056     056     000
        002467          126     123     050
        002472          126     051     061
        002475          061     040     111
        002478          116     124     105
    
```

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 10-1
HARDWARE PARAMETER CODING SECTION

002475	122	122	125
002500	120	124	040
002503	126	105	103
002506	124	117	122
002511	056	056	
623			
624 002514			

.EVEN
ENDHRD

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 11
 SOFTWARE P-TABLE

```

626
627
628
629
630
631
632 002514
633 002516 000001
634
635 002520
636
637
638
639
640
641
642
643
644
645
646
647 002520
648 002522
649 002530
650 002532      124      117      114
      002535      105      122      101
      002540      116      103      105
      002543      040      124      105
      002546      123      124      111
      002551      116      107      040
      002554      122      105      121
      002557      125      111      122
      002562      105      104      077
      002565      077
651 002566      015
652 002567      012
653 002570      101      116      123
      002573      127      105      122
      002576      040      131      050
      002601      105      123      051
      002604      040      106      117
      002607      122      040      124
      002612      117      114      105
      002615      122      101      116
      002620      103      105      040
      002623      116      050      117
      002626      051      040      106
      002631      117      122      040
      002634      107      117      055
      002637      116      117      107
      002642      117      040      124
      002645      105      123      124
      002650      000
654
655 002652
    
```

.SBTTL SOFTWARE P-TABLE

```

:++
: THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
: PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
:--
    
```

```

          BGNSW  SFPTBL
TOL:     .WORD  1           ; 0 FOR GO-NOGO TESTING
                               ; 1 FOR TOLERANCE TESTING
          ENDSW
    
```

.SBTTL SOFTWARE PARAMETER CODING SECTION

```

:++
: THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
: THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES. THE
: MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
: INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES. THE
: MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
: WITH THE OPERATOR.
:--
    
```

```

          BGNSFT
GPRML    SM1,0,-1,YES      ; ASK IF TOLERANCE TESTING REQUIRED
          EXIT SFT
SM1:     .ASCII  /TOLERANCE TESTING REQUIRED??/
    
```

```

          .BYTE  15
          .BYTE  12       ; CR/LF
          .ASCIZ  /ANSWER Y(ES) FOR TOLERANCE N(O) FOR GO-NOGO TEST/
    
```

```

          .EVEN
          ENDSFT
    
```

CZVSVAO COLOUR LOOKUP OPTION
GLOBAL EQUATES SECTION

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656
657
658
659
660
661
662
663 002652

.SBTTL GLOBAL EQUATES SECTION

;++
: THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
: ARE USED IN MORE THAN ONE TEST.
:--

EQUALS ; GET STANDARD EQUATES.

: BIT DEFINITIONS

100000	BIT15== 100000
040000	BIT14== 40000
020000	BIT13== 20000
010000	BIT12== 10000
004000	BIT11== 4000
002000	BIT10== 2000
001000	BIT09== 1000
000400	BIT08== 400
000200	BIT07== 200
000100	BIT06== 100
000040	BIT05== 40
000020	BIT04== 20
000010	BIT03== 10
000004	BIT02== 4
000002	BIT01== 2
000001	BIT00== 1
001000	BIT9== BIT09
000400	BIT8== BIT08
000200	BIT7== BIT07
000100	BIT6== BIT06
000040	BIT5== BIT05
000020	BIT4== BIT04
000010	BIT3== BIT03
000004	BIT2== BIT02
000002	BIT1== BIT01
000001	BIT0== BIT00

: EVENT FLAG DEFINITIONS
: EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION

000040	EF.START== 32.	: START COMMAND WAS ISSUED
000037	EF.RESTART== 31.	: RESTART COMMAND WAS ISSUED
000036	EF.CONTINUE== 30.	: CONTINUE COMMAND WAS ISSUED
000035	EF.NEW== 29.	: A NEW PASS HAS BEEN STARTED
000034	EF.PWR== 28.	: A POWER-FAIL/POWER-UP OCCURRED

: PRIORITY LEVEL DEFINITIONS

000340	PRI07== 340
000300	PRI06== 300
000240	PRI05== 240
000200	PRI04== 200
000140	PRI03== 140
000100	PRI02== 100

CZVSVAO COLOUR LOOKUP OPTION
GLOBAL EQUATES SECTION

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000040
000000

PRI01== 40
PRI00== 0

.; OPERATOR FLAG BITS

000004
000010
000020
000040
000100
000200
000400
001000
002000
004000
010000
020000
040000
100000

EVL== 4
LOT== 10
ADR== 20
IDU== 40
ISR== 100
UAM== 200
BOE== 400
PNT== 1000
PRI== 2000
IXE== 4000
IBE== 10000
IER== 20000
LOE== 40000
HOE== 100000

664

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 13
 *** VSV-11 INSTRUCTION EQUATES.

```

666      .SBTTL *** VSV-11 INSTRUCTION EQUATES.
667      ;
668      ;PLOTTING INSTRUCTIONS.
669      ;
670      100000 CHAR== 100000 ; CHARACTER MODE.
671      104000 SVEC== 104000 ; SHORT VECTOR MODE.
672      110000 LVEC== 110000 ; LONG VECTOR MODE.
673      114000 APNT== 114000 ; ABSOLUTE POINT MODE.
674      120000 GHX== 120000 ; GRAPH/HISTOGRAM X MODE.
675      124000 GHY== 124000 ; GRAPH/HISTOGRAM Y MODE.
676      130000 RPNT== 130000 ; RELATIVE POINT MODE.
677      ;
678      ;PIXEL DATA FIELD <10:2> FOR THE ABOVE OPCODES.
679      ;
680      002000 L0== BIT10 ; LEVEL 0 (BLACK) IS JUST THE ENABLE.
681      002377 L255== L0!<377> ; LEVEL 255 IS THE MAX POSSIBLE.
682      002377 ALL== L255
683      ;
684      ; COLOR LOOK-UP-RAM DEFINITIONS.
685      ;
686      010000 LREAD== BIT12 ; CSR -- READ DATA FROM ADDR <7:0>.
687      002000 LDI== BIT10 ; INTERRUPT ON READ/WRITE DONE.
688      ;
689      010000 LSET== BIT12 ; DATA REG -- SET ALL ADDRESSES TO...
690      ;...DATA PATTERN IN <11:0>...
691      ;...BLU<11:8>, GRN<7:4>, RED<3:0>.
692      ;
693      000100 GCOFF== BIT6 ; MAINT REG -- GAMMA CORRECT OFF.
694      000040 CVC== BIT5 ; COMP VIDEO > MDAC (READ-ONLY).
695      000020 REDC== BIT4 ; RED DAC > MDAC (READ-ONLY).
696      000010 GRNC== BIT3 ; GRN DAC > MDAC (READ-ONLY).
697      000004 BLUC== BIT2 ; BLU DAC > MDAC (READ-ONLY).
698      000000 MDV0== 0 ; SET MAINT DAC TO 0.0 V.
699      000001 MDV1== 1 ; 0.5 V.
700      000002 MDV2== 2 ; 1.0 V.
701      000003 MDV3== 3 ; 1.35 V.
702      ;
703      ; BIT MAP MODE DEFINITIONS.
704      ;
705      136000 BM14== 136000 ; MODE 1 WITH 4 BIT PIXELS.
706      137000 BM18== 137000 ; MODE 1 WITH 8 BIT PIXELS.
707      ; PIXEL COUNT IN <8:0>.
708      ;
709      134000 BM04== 134000 ; MODE 0 WITH 4 BIT PIXELS.
710      135000 BM08== 135000 ; MODE 0 WITH 8 BIT PIXELS.
711      000000 M32== 0 ; 32 SQUARE PIXEL ARRAY.
712      000001 M64== 1 ; 64 SQUARE.
713      000002 M128== 2 ; 128 SQUARE.
714      000003 M256== 3 ; 256 SQUARE.
715      000010 EX2== 10 ; EXPAND BY 2, NO SMOOTHING.
716      000020 EX4== 20 ; EXPAND BY 4, NO SMOOTHING.
717      000050 EXSM2== 50 ; EXPAND AND SMOOTH BY 2.
718      000060 EXSM4== 60 ; EXPAND AND SMOOTH BY 4.
719      000100 R256== 100 ; 256 X 256 RESOLUTION.

```

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 14
 *** VSV-11 INSTRUCTION EQUATES.

```

721          ;CONTROL AND STATUS INSTRUCTIONS.
722          ;
723          146040 CUOFF== 146040          ;CURSOR (JOY-STICK) VIDEO OFF.
724          146060 CUON== 146060          ;CURSOR VIDEO ON.
725          146100 CURD== 146100          ;READ JSX,JSY => DXR,DYR.
726          146016 CUIM== 146016          ;INTERRUPT ON MATCH (SWITCH DISABLED).
727          146013 CUIS== 146013          ;INTERRUPT ON SWITCH (MATCH DISABLED).
728          146012 CUIOFF== 146012        ;INTERRUPTS (BOTH) OFF.
729
730          150000 SETHB== 150000          ;SET GRAPH/HISTO BASE LINE.
731          152000 SETCB== 152000          ;SET CHARACTER BASE ADDRESS.
732
733          160000 DJMP== 160000           ;DISPLAY JUMP.
734          164000 DNOP== 164000          ;DISPLAY NO-OP.
735          165000 DPOP== 165000          ;DPOP = RTS FROM CHARACTER SUB-PIX.
736          164001 SYNC== DNOP+1          ;PROCEED IN SYNC = DNOP + N <8:0>.
737          ;WAITS FOR N OCCURRENCES OF VERTICAL...
738          ;...SYNC START, THEN PROCEEDS...
739          ;...(16.6MS @ 60HZ OR 20MS @ 50HZ).
740
741          170200 SWTCH== 170200          ;SWITCH READ/WRITE STATUS.
742          170140 CLRMEM== 170140         ;CLEAR IMAGE MEMORY TO 0'S.
743          170100 SETMEM== 170100        ;SET IMAGE MEMORY TO CURRENT PIX DATA.
744
745          172000 STOP== 172000           ;DISPLAY STOP.
746          171000 SIOFF== 171000         ;STOP INTERRUPT DISABLE.
747          171400 SION== 171400          ;STOP INTERRUPT ENABLE.
748          173000 STOPN== STOP!SIOFF      ;STOP, DO NOT INTERRUPT.
749          173400 STOPI== STOP!SION       ;STOP AND INTERRUPT.
750
751          174100 GXI== 174100            ;SET X INCREMENT <5:0> FOR GRAPH/HST Y.
752          174100 GYI== GXI              ;SET Y INCREMENT <5:0> FOR GRAPH/HST X.
753
754          000001 HCPY== BIT0             ;ENABLE HARD-COPY.
755          000010 SWE== BIT3             ;ENABLE SWITCH RD/WRT.
756          176000 PROTEC== 176000        ;PROTECT MEMORY (OFF).
757          176050 READ== 176040!SWE      ;READ MEM (DISPLAY), SWITCH ENABLED.
758          176034 WRT== 176024!SWE       ;WRITE MEM (1'S AND 0'S), SWITCH ENABLED.
759          176036 WRT1== 176026!SWE      ;WRITE MEM (1'S ONLY), SWITCH ENABLED.
760          176074 RDWRT== READ!WRT        ;READ, WRITE ALL DURING RETRACE.
761          176076 RDWRT1== READ!WRT1     ;READ, WRITE 1'S DURING RETRACE.
762          176051 HCOPY== READ!HCPY       ;READ MEM => HARD COPY DEVICE.
763
764          000000 CH0== 0                  ;CHANNEL SELECT BITS...
765          000400 CH1== BIT8              ;...FOR MEMORY CONTROL...
766          001000 CH2== BIT9              ;...INSTRUCTIONS (176XXX).
767          001400 CH3== BIT8!BIT9
768
769          000000 JS0== CH0                 ;JOY-STICK UNIT SELECT BITS...
770          000400 JS1== CH1                 ;...FOR CURSOR CONTROL...
771          001000 JS2== CH2                 ;...INSTRUCTIONS (146XXX).
772          001400 JS3== CH3

```

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 15
 *** VSV-11 INSTRUCTION EQUATES.

```

774      ;OTHER USEFUL DEFINITIONS.
775      ;
776      040000      I==      BIT14      ;INTENSIFY VECTOR OR POINT.
777      020000      MSX==     BIT13      ;MINUS SIGNS FOR...
778      000100      MSY==     BIT6       ;...SHORT FORM VECTOR DATA.
779      020000      MXY==     BIT13     ;MINUS SIGN FOR LONG FORM DATA.
780      040000      HST==     BIT14     ;USE GHX/GHY DATA AS HISTOGRAM.
781
782      001776      MAXX==    511.*2     ;MAXIMUM X ADDRESS (512 X 512 X 2).
783      001776      MAXY==    MAXX      ;SAME FOR Y.
784      000776      HAFX==    <MAXX/2>-1 ;HALF MAX X (CENTER SCREEN).
785      000776      HAFY==    HAFX      ;SAME FOR Y.
786
787      001776      MAXY50==  511.*2    ;MAX VISIBLE Y ON 50HZ SYSTEM.
788      000776      HAFY50==  <MAXY50/2>-1 ;HALF VISIBLE Y.
789
790      001676      MAXY60==  <511.-32.>*2 ;MAX VISIBLE Y ON 60HZ SYSTEM.
791      000736      HAFY60==  <MAXY60/2>-1 ;HALF VISIBLE Y.
792
793      000002      DX==      2          ;DELTA X (1 PIXEL UNIT).
794      000002      DYI==    DX         ;DELTA Y, INTERLACED MODE.
795      000004      DYNI==   DX*2       ;DELTA Y, NON-INTERLACED MODE.
796
797      000014      SETRR==   14        ; SET RELOCATE REGISTER WITH <15:4>...
798      ;...DSR<15:4> BECOMES RR<17:6>.

```


CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 16
 *** SPECIAL MACROS AND OPDEFS.

```

800      .SBTTL *** SPECIAL MACROS AND OPDEFS.
801      :
802      : MACRO TO XCT MEMORY SETUP FUNCTIONS (STAT C INSTRUCTIONS)
803      : VAILD FUNCTIONS ARE:
804      : PROTEC, READ, WRT, WRT1, RDWRT, RDWRT1, HCOPY.
805      :
806      :   .MACRO SETUP FUNC,N1,N2,N3,N4
807      :   .IIF NB <N1>,   FUNC!CH'N1
808      :   .IIF NB <N2>,   FUNC!CH'N2
809      :   .IIF NB <N3>,   FUNC!CH'N3
810      :   .IIF NB <N4>,   FUNC!CH'N4
811      :   .ENDM   SETUP
812      :
813      : MACROS FOR ASSEMBLING VECTOR DATA.
814      : CALLING ARGUMENTS ARE:
815      :   A = INTENSIFY BIT, 'I' OR 'U'.
816      :   B = DELTA X, +/-0 THRU 1776 (76 IF SHORT TYPE).
817      :   C = DELTA Y,           DITTO
818      :
819      :   .MACRO SXY A,B,C           ;ASSEMBLE SHORT (1 WORD) DATA.
820      :   .I = 40000
821      :   .DX = B*200
822      :   .DY = C
823      :   .IIF IDN <U> <A>, .I = 0
824      :   .IIF LT B, .DX = <-B*200>!20000
825      :   .IIF LT C, .DY = <-C>!100
826      :   .WORD .I!.DX!.DY
827      :   .ENDM   SXY
828      :
829      :   .MACRO LXY A,B,C           ;ASSEMBLE LONG (2 WORDS) DATA.
830      :   .I = 40000
831      :   .DX = B
832      :   .DY = C
833      :   .IIF IDN <U> <A>, .I = 0
834      :   .IIF LT B, .DX = <-B>!20000
835      :   .IIF LT C, .DY = <-C>!20000
836      :   .WORD .I!.DX, .DY
837      :   .ENDM   LXY
838      :
839      : SOME HANDY -11 OPDEF'S.
840      :
841      :   SKP3= BR+3           ;SKIP NEXT 3 WORDS.
842      :   SKP2= BR+2           ;SKIP NEXT 2 WORDS.
843      :   SKP1= BR+1           ;SKIP NEXT WORD.
844      :   SKP0= BR+0          ;SAME AS A NOP.

```

```

000403
000402
000401
000400

```

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 17
 *** SPECIAL MACROS AND OPDEFS.

```

846      ;
847      ; MACRO TO STANDARDIZE THE INITIALIZATION OF EACH TEST.
848      ; PROVIDES AN ASCIZ TITLE STRING, AND POINTER FOR
849      ; SUBSEQUENT PRINTING (IF REQ'D) VIA 'PRINTF TNAM,TNUM' CALL.
850      ; ALSO INIT'S A SEQUENTIAL ERROR NUMBER SEQUENCE, AND
851      ; SETS AN ITERATION COUNT FOR THE CURRENT TEST.
852      ;
853      ;
854      ; .MACRO BEGIN.TEST TEXT,LK,?TAG1,?TAG2
855      ; BGNTST
856      ; TN=T$TESTNUM ; TEST NUMBER
857      ; EN=TN*100. ; INIT ERROR NUMBER SEQUENCE.
858      ; .IIF B <LK>, MOV #1,LOOPK ; DEFAULT = 1.
859      ; .IIF NB <LK>, MOV #LK,LOOPK
860      ; MOV #TAG1,TNAM ; ...AND NAME POINTER.
861      ; BR TAG2 ; SKIP OVER THE ASCII.
862      TAG1: .ASCIZ \%A: TEXT\
863      ; .EVEN
864      TAG2: .ENDM BEGIN.TEST
865      ;
866      ; MACROS TO DEFINE SEQUENTIAL ERROR NUMBERS FOR
867      ; SUBSEQUENT SUPERVISOR ERROR CALLS.
868      ; REQUIRES PRIOR USE OF 'BEGIN.TEST' MACRO.
869      ;
870      ; .MACRO SFERR ADDR,PNTR ; SYSTEM FATAL.
871      ; EN=EN+1
872      ; ERRSF EN,ADDR,PNTR
873      ; .ENDM SFERR
874      ;
875      ; .MACRO DFERR ADDR,PNTR ; DEVICE FATAL.
876      ; EN=EN+1
877      ; ERRDF EN,ADDR,PNTR
878      ; .ENDM DFERR
879      ;
880      ; .MACRO SFTERR ADDR,PNTR ; SOFT ERROR.
881      ; EN=EN+1
882      ; ERRSOFT EN,ADDR,PNTR
883      ; .ENDM SFTERR
884      ;
885      ; .MACRO HRDERR ADDR,PNTR ; HARD ERROR.
886      ; EN=EN+1
887      ; ERRHRD EN,ADDR,PNTR
888      ; .ENDM HRDERR

```

CZVSVAO COLOUR LOOKUP OPTION
GLOBAL DATA SECTION

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```

890      .SBTTL GLOBAL DATA SECTION
891
892      :++
893      : THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
894      : IN MORE THAN ONE TEST.
895      :--
896
897      :
898      : THE FOLLOWING DATA ARE SET FOR EACH UNIT AT INIT TIME.
899      : SINGLE UNIT DEFAULTS (LISTED) ARE IN THE DEFAULT P-TABLE.
900
901      UUT:: 0          ;UNIT # UNDER TEST.
902      QVP:: 0          ;QUICK VERIFY FLAG.
903
904      DPC:: 172010     ;DISPLAY PC
905      DSR:: 172012     ;DISPLAY STATUS REGISTER (ALSO REL REG).
906      DXR:: 172014     ;DISPLAY X POSITION REGISTER.
907      DYP:: 172016     ;DISPLAY Y POSITION REGISTER.
908
909      LSR:: 172020     ; LOOK-UP-RAM STATUS.
910      LDR:: 172022     ;          DATA.
911      LMR:: 172024     ;          AND MAINT REGISTERS.
912
913
914      DPRI:: PRI04     ;INTERRUPT PRIORITY.
915      STPV:: 320       ;STOP VECTOR
916      JSMV:: 324       ;JOY-STICK MATCH VECTOR.
917      TOTV:: 330       ;TIME-OUT VECTOR
918      JSSV:: 334       ;JOY-STICK SWITCH (DEMAND) VECTOR.
919      LUTV:: 340       ; LUT READ/WRITE DONE VECTOR.
920
921      :
922      : MISCELANEOUS STORAGE REGISTERS.
923
924      IDPC:: 0          ;SAVED DPC ON ANY INTERRUPT.
925      IDSR:: 0          ;          DITTO DSR
926      IDXR:: 0          ;          DITTO DXR
927      IDYR:: 0          ;          DITTO DYP
928      ILSR:: 0          ;          DITTO LUT CSR
929      ILDR:: 0          ;          DITTO LUT DATA
930      ILMR:: 0          ;          DITTO LUT MAINT.
931
932      FLAGS: 0          ; START-UP COMMAND FLAGS (SWITCH REGISTER).
933
934      LUTAV:: 0         ; NON-ZERO = LUT AVAILABLE.
935      SHADLY:: 0        ; SHADING DELAY COUNTER (OPTIONAL).
936      HUE:: NTSC8+2     ; CURRENT COLOR POINTER (OPTIONAL).
937
938      TEMP1:: 0         ;SOME TEMP LOCATIONS.
939      TEMP2:: 0
940      TEMP3:: 0

```

CZVSVAO COLOUR LOOKUP OPTION
GLOBAL TEXT SECTION

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941
942
943
944
945
946
947

.SBTTL GLOBAL TEXT SECTION

;++
: THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
: MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
: MORE THAN ONE TEST.
:--

CZVSVAO COLOUR LOOKUP OPTION
GLOBAL ERROR REPORT SECTION

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949
950
951
952
953
954
955
956
957 002744
958 002744
959 002772 004737 003232
960 002776
961
962 003000
963 003000
964 003022 004737 003232
965 003026
966
967 003030
968 003030
969 003054 004737 003232
970 003060
971
972 003062
973 003062
974 003112 004737 003232
975 003116
976
977 003120
978 003120
979 003140
980 003164 004737 003232
981 003170
982
983 003172
984 003172
985
986
987
988 003222
003222 000000
003224 000000
003226 000000
003230 000000
989
990
991
992
993 003232 005727
994 003234 000000
995 003236 001402
996 003240 004777 177770
997 003244 000207
998
999
1000
1001

.SBTTL GLOBAL ERROR REPORT SECTION

```

:++
: THE GLOBAL ERROR REPORT SECTION CONTAINS THE PRINT CALLS
: AND ASCII TEXT FOR ALL ERRORS. SOME ADDITIONAL TEXT
: (OPTIONAL EXTENSIONS) MAY BE FOUND WITHIN INDIVIDUAL TESTS.
:--

```

```

BGNMSG UTOERR ; DPU TIME-OUT ERROR -- SYSTEM FATAL ERROR.
PRINTX #UTOX,R1,@DPC ; R1 = CPU PC
JSR PC,EXTEND ; PRINT EXTENSION IF REQUIRED.
ENDMSG

```

```

BGNMSG NXRERR ; NON-EX REGISTER -- DEVICE FATAL ERROR.
PRINTX #NXRX,R1 ; R1 = NEXM ADDRESS.
JSR PC,EXTEND ; PRINT EXTENSION IF REQUIRED.
ENDMSG

```

```

BGNMSG LINTER ; LUT INTERRUPT ERROR.
PRINTX #LINTX,@LSR ; SHOW CSR.
JSR PC,EXTEND ; PRINT EXTENSION IF REQUIRED.
ENDMSG

```

```

BGNMSG LRWERR ; LUT READ/WRITE ERROR.
PRINTX #LRWX,@LSR,R1,R2 ; CSR, EXP'D, REC'D.
JSR PC,EXTEND ; PRINT EXTENSION IF REQUIRED.
ENDMSG

```

```

BGNMSG DACERR ; DAC OUTPUT ERROR.
PRINTX DACX
PRINTX #DACGC,GCX
JSR PC,EXTEND ; PRINT EXTENSION.
ENDMSG

```

```

BGNMSG MRWERR ; MAINTENANCE REG R/W/ ERROR
PRINTX #LMER,@LMR,R1,R2

```

```

: DYNAMIC ERROR TABLE USED IN SOME OF THE TESTS.
:

```

```

: ERRTBL
ERRTYP:: .WORD 0
ERRNBR:: .WORD 0
ERRMSG:: .WORD 0
ERRBLK:: .WORD 0

```

```

: THIS ROUTINE APPENDS A UNIQUE EXTENSION (IF REQUIRED)
: TO ANY OF THE ABOVE ERROR SIGNATURES.
:

```

```

EXTEND: TST (PC)+
EXTA: 0 ; 0 = NO EXTENSION.
BEQ 1$
JSR PC,@EXTA ; APPEND EXTENSION TEXT.
1$: RTS PC

```

```

: ASCII ERROR MESSAGES (EXTENSIONS MAY BE USED IF REQUIRED).
:

```

CZVSVAO COLOUR LOOKUP OPTION
GLOBAL ERROR REPORT SECTION

MACRO M1200 28-APR-83 14:05 PAGE 20-1

```

1002          ; SYSTEM FATAL ERROR.
1003          ;
1004 003246    040    040    125  UTO:  .ASCIZ / UNEXPECTED DPU "TIME-OUT" INTERRUPT/
      003251    116    105    130
      003254    120    105    103
      003257    124    105    104
      003262    040    104    120
      003265    125    040    042
      003270    124    111    115
      003273    105    055    117
      003276    125    124    042
      003301    040    111    116
      003304    124    105    122
      003307    122    125    120
      003312    124    000
1005 003314    045    101    040  UTOX: .ASCIZ /%A CPU PC: %06%A DPC: %06/
      003317    040    103    120
      003322    125    040    120
      003325    103    072    040
      003330    045    117    066
      003333    045    101    040
      003336    040    104    120
      003341    103    072    040
      003344    045    117    066
      003347    000
1006          ;
1007          ; DEVICE FATAL ERROR.
1008          ;
1009 003350    040    040    116  NXR:  .ASCIZ / NON-EXISTANT DEVICE REGISTER/
      003353    117    116    055
      003356    105    130    111
      003361    123    124    101
      003364    116    124    040
      003367    104    105    126
      003372    111    103    105
      003375    040    122    105
      003400    107    111    123
      003403    124    105    122
      003406    000
1010 003407    045    101    040  NXRX: .ASCIZ /%A ADDRESS: %06/
      003412    040    101    104
      003415    104    122    105
      003420    123    123    072
      003423    040    045    117
      003426    066    000
1011          ;
1012          ; DEVICE HARD ERRORS.
1013          ;
1014 003430    040    040    114  NLRI: .ASCIZ / LUT READ INTERRUPT EXPECTED, NOT RECEIVED/
      003433    125    124    040
      003436    122    105    101
      003441    104    040    111
      003444    116    124    105
      003447    122    122    125
      003452    120    124    040
      003455    105    130    120
      003460    105    103    124

```

CZVSVAO COLOUR LOOKUP OPTION
GLOBAL ERROR REPORT SECTION

MACRO M1200 28-APR-83 14:05 PAGE 20-2

	003463	105	104	054	
	003466	040	116	117	
	003471	124	040	122	
	003474	105	103	105	
	003477	111	126	105	
	003502	104	000		
1015	003504	040	040	114	NLWI: .ASCIZ / LUT WRITE INTERRUPT EXPECTED, NOT RECEIVED/
	003507	125	124	040	
	003512	127	122	111	
	003515	124	105	040	
	003520	111	116	124	
	003523	105	122	122	
	003526	125	120	124	
	003531	040	105	130	
	003534	120	105	103	
	003537	124	105	104	
	003542	054	040	116	
	003545	117	124	040	
	003550	122	105	103	
	003553	105	111	126	
	003556	105	104	000	
1016	003561	040	040	125	ULRI: .ASCIZ / UNEXPECTED LUT READ INTERRUPT/
	003564	116	105	130	
	003567	120	105	103	
	003572	124	105	104	
	003575	040	114	125	
	003600	124	040	122	
	003603	105	101	104	
	003606	040	111	116	
	003611	124	105	122	
	003614	122	125	120	
	003617	124	000		
1017	003621	040	040	125	ULWI: .ASCIZ / UNEXPECTED LUT WRITE INTERRUPT/
	003624	116	105	130	
	003627	120	105	103	
	003632	124	105	104	
	003635	040	114	125	
	003640	124	040	127	
	003643	122	111	124	
	003646	105	040	111	
	003651	116	124	105	
	003654	122	122	125	
	003657	120	124	000	
1018	003662	045	101	040	LINTX: .ASCIZ /%A CSR: %06/
	003665	040	103	123	
	003670	122	072	040	
	003673	045	117	066	
	003676	000			
1019	003677	040	040	114	LAIER: .ASCIZ / LUT AUTO-INCR INCORRECT ON READ/
	003702	125	124	040	
	003705	101	125	124	
	003710	117	055	111	
	003713	116	103	122	
	003716	040	111	116	
	003721	103	117	122	
	003724	122	105	103	
	003727	124	040	117	

CZVSVAD COLOUR LOOKUP OPTION
GLOBAL ERROR REPORT SECTION

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	003732	116	040	122	
	003735	105	101	104	
	003740	000			
1020	003741	040	040	114	LAIEW: .ASCIZ / LUT AUTO-INCR INCORRECT ON WRITE/
	003744	125	124	040	
	003747	101	125	124	
	003752	117	055	111	
	003755	116	103	122	
	003760	040	111	116	
	003763	103	117	122	
	003766	122	105	103	
	003771	124	040	117	
	003774	116	040	127	
	003777	122	111	124	
	004002	105	000		
1021	004004	040	040	114	LDINC: .ASCIZ / LUT DATA INCORRECT/
	004007	125	124	040	
	004012	104	101	124	
	004015	101	040	111	
	004020	116	103	117	
	004023	122	122	105	
	004026	103	124	000	
1022	004031	045	101	040	LRWX: .ASCIZ /%A CSR: %06%A EXP'D: %06%A REC'D: %06/
	004034	040	103	123	
	004037	122	072	040	
	004042	045	117	066	
	004045	045	101	040	
	004050	040	105	130	
	004053	120	047	104	
	004056	072	040	045	
	004061	117	066	045	
	004064	101	040	040	
	004067	122	105	103	
	004072	047	104	072	
	004075	040	045	117	
	004100	066	000		
1023	004102	040	114	125	MAIER: .ASCIZ / LUT MAINTENANCE REG READ WRITE ERROR /
	004105	124	040	115	
	004110	101	111	116	
	004113	124	105	116	
	004116	101	116	103	
	004121	105	040	122	
	004124	105	107	040	
	004127	122	105	101	
	004132	104	040	127	
	004135	122	111	124	
	004140	105	040	105	
	004143	122	122	117	
	004146	122	040	000	
1024	004151	045	101	040	LMER: .ASCIZ /%A MAINT REG: %06%A EXP'D: %06%A REC'D: %06/
	004154	115	101	111	
	004157	116	124	040	
	004162	122	105	107	
	004165	072	040	045	
	004170	117	066	045	
	004173	101	040	040	
	004176	105	130	120	

CZVSVAD COLOUR LOOKUP OPTION
GLOBAL ERROR REPORT SECTION

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	004201	047	104	072	
	004204	040	045	117	
	004207	066	045	101	
	004212	040	040	122	
	004215	105	103	047	
	004220	104	072	040	
	004223	045	117	066	
	004226	000			
1025	004227	040	040	122	RDERR: .ASCIZ / RED DAC ERROR/
	004232	105	104	040	
	004235	104	101	103	
	004240	040	105	122	
	004243	122	117	122	
	004246	000			
1026	004247	040	040	107	GDERR: .ASCIZ / GREEN DAC ERROR/
	004252	122	105	105	
	004255	116	040	104	
	004260	101	103	040	
	004263	105	122	122	
	004266	117	122	000	
1027	004271	040	040	102	BDERR: .ASCIZ / BLUE DAC ERROR/
	004274	114	125	105	
	004277	040	104	101	
	004302	103	040	105	
	004305	122	122	117	
	004310	122	000		
1028	004312	040	040	103	CDERR: .ASCIZ / COMPOSITE DAC ERROR/
	004315	117	115	120	
	004320	117	123	111	
	004323	124	105	040	
	004326	104	101	103	
	004331	040	105	122	
	004334	122	117	122	
	004337	000			
1029	004340	045	101	040	DACX1: .ASCIZ /%A INPUT REQUIRED TO EXCEED THRESHOLD INCORRECT/
	004343	040	111	116	
	004346	120	125	124	
	004351	040	122	105	
	004354	121	125	111	
	004357	122	105	104	
	004362	040	124	117	
	004365	040	105	130	
	004370	103	105	105	
	004373	104	040	124	
	004376	110	122	105	
	004401	123	110	117	
	004404	114	104	040	
	004407	111	116	103	
	004412	117	122	122	
	004415	105	103	124	
	004420	000			
1030	004421	045	101	040	DACX2: .ASCIZ /%A FAILED TO CROSS ALL MAINTENANCE THRESHOLDS/
	004424	040	106	101	
	004427	111	114	105	
	004432	104	040	124	
	004435	117	040	103	
	004440	122	117	123	

CZVSVAO COLOUR LOOKUP OPTION
GLOBAL ERROR REPORT SECTION

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	004443	123	040	101	
	004446	114	114	040	
	004451	115	101	111	
	004454	116	124	105	
	004457	116	101	116	
	004462	103	105	040	
	004465	124	110	122	
	004470	105	123	110	
	004473	117	114	104	
	004476	123	000		
1031	004500	045	116	045	DACGC: .ASCIZ /%N% GAMMA CORRECTION IS -- %T/
	004503	101	040	040	
	004506	107	101	115	
	004511	115	101	040	
	004514	103	117	122	
	004517	122	105	103	
	004522	124	111	117	
	004525	116	040	111	
	004530	123	040	055	
	004533	055	040	045	
	004536	124	000		
1032	004540	040	117	116	GON: .ASCIZ / ON /
	004543	040	000		
1033	004545	040	117	106	GOFF: .ASCIZ / OFF/
	004550	106	000		
1034					.EVEN
1035	004552	004421			DACX: DACX2 ; OR DACX1
1036	004554	004540			GON ; OR GOFF

CZVSVAO COLOUR LOOKUP OPTION
GLOBAL SUBROUTINES SECTION

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```

1038      .SBTTL GLOBAL SUBROUTINES SECTION
1039
1040      :++
1041      : THE GLOBAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
1042      : THAT ARE USED IN MORE THAN ONE TEST.
1043      :--
1044
1045      :
1046      : DEFAULT DISPLAY INTERRUPT HANDLERS.
1047      : IF DISPLAY TIME-OUT, REPORT SYSTEM FATAL, AND ABORT PASS.
1048      : OTHERWISE, SAVE DPU REGISTERS AND DISMISS.
1049
1050 004556 011601      DTO:  MOV      (SP),R1      ;DISPLAY TIME-OUT, GET CPU PC...
1051 004560 012716 004566  MOV      #1$, (SP)      ;...FIX STACK TO RETURN HERE...
1052 004564 000415      BR       DPUSAV      ;...AFTER THE "SAVE".
1053 004566 005037 003234 1$:   CLR      EXTA      ; CLEAR EXTENSION FLAG.
1054 004572      ERRSF    0,UTO,UTOERR ;REPORT ERROR...
1055 004602      DOCLN      ;...AND ABORT PASS.
1056
1057 004604 000137      DSTP:  JMP      @(PC)+
1058 004606 004620      DPUSAV
1059 004610 000137      DJM:   JMP      @(PC)+
1060 004612 004620      DPUSAV
1061 004614 000137      DJS:   JMP      @(PC)+
1062 004616 004620      DPUSAV
1063
1064 004620 017737 176032 002710 DPUSAV: MOV    @DPC, IDPC      ;SAVE DISPLAY PC...
1065 004626 017737 176026 002712  MOV    @DSR, IDSR      ;...STATUS...
1066 004634 017737 176022 002714  MOV    @DXR, IDXR      ;...X POSITION...
1067 004642 017737 176016 002716  MOV    @DYR, IDYR      ;...Y POSITION...
1068 004650 000002      RTI      ;...AND DISMISS.
1069
1070      :
1071      : AND A SIMILAR ONE FOR THE LUT INTERRUPTS.
1072
1072 004652 000137      LDUN:  JMP      @(PC)+
1073 004654 004656      LUTSAV
1074 004656 017737 176004 002720 LUTSAV: MOV    @LSR, ILSR      ; SAVE LUT REGISTERS.
1075 004664 017737 176000 002722  MOV    @LDR, ILDR
1076 004672 017737 175774 002724  MOV    @LMR, ILMR
1077 004700 000002      RTI      ; AND DISMISS.

```

CZVSVAO COLOUR LOOKUP OPTION
GLOBAL SUBROUTINES SECTION

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```

1079
1080      : SUBROUTINE TO INITIALIZE THE CURRENT UNIT DISPLAY.
1081      : CALL "CLRW" TO INIT WITH IM'S IN WRITE MODE.
1082      : CALL "CLRRW" TO INIT WITH IM'S IN WRITE-IN-RETRACE MODE.
1083      :
1084      :
1085 004702 012777 004726 175746 CLRW:  .ENABL  LSB           ; 'WRITE' MODE ENTRY.
1086 004710 000403                SKP3
1087 004712 012777 004742 175736 CLRRW: MOV      #2$,@DPC      ; 'READ/WRITE' MODE ENTRY.
1088 004720 004737 005214        JSR      PC,WAITF
1089 004724 000207                RTS      PC
1090
1091 004726                1$:  SETUP  WRT,0,1,2,3    ;ALL IM'S TO WRITE MODE...
1092 004736 160000 004752        DJMP,3$
1093 004742                2$:  SETUP  RDWRT,0,1,2,3  ;...OR WRITE-IN-RETRACE MODE...
1094 004752 170140                3$:  CLRMEM
1095 004754 116000                APNT!LO      ;...CLEAR IM'S...
1096 004756 000000 000000        0,0        ;...CLEAR DATA LATCH...
1097 004762 146052                CUOFF!CUIOFF ;...AND X/Y POSITION...
1098 004764 173000                STOPN     ;...CURSOR OFF...
1099                .DSABL  LSB           ;...STOP, ALL INTS DISABLED.
1100
1101      :
1102      : ANOTHER TO RELEASE THE DPU.
1103      : EXECUTE "EXT STOP" IF HE'S RUNNING, "BUS-INIT" IF HE'S HUNG.
1104 004766 005777 175666 RELEAS: TST      @DSR
1105 004772 100410                BMI      1$           ;EXIT IF HE'S FREE.
1106 004774 005077 175660                CLR      @DSR      ;XCT "EXTERNAL STOP".
1107 005000 004737 005214        JSR      PC,WAITF
1108 005004 103403                BCS     1$           ;EXIT IF STOP WORKED.
1109 005006                BRESET
1110 005010 004737 005214        JSR      PC,WAITF ;IT DIDN'T, XCT BUS-INIT...
1111 005014 000207                RTS      PC           ;...AND WAIT AGAIN.

```

CZVSVAO COLOUR LOOKUP OPTION
GLOBAL SUBROUTINES SECTION

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1113
1114      ; SUBROUTINE TO BLAST THE LUT RAM WITH COLOR OR GREY-SCALE DATA.
1115      ;
1116 005016 012701 013026  LUMIN: MOV    #LUMTBL,R1    ; GREY-SCALE TABLE ADDRESS.
1117 005022 012746 000001      MOV    #1,-(SP)          ; LUT WORDS / SHADE.
1118 005026 000404      SKP2+2
1119 005030 012701 014030  NTSC:  MOV    #NTSC8,R1     ; BASIC 8 COLOR TABLE ADDRESS.
1120 005034 012746 000040      MOV    #32,-(SP)        ; LUT WORDS / COLOR.
1121 005040 000404      SKP2+2
1122 005042 012701 014052  CL16:  MOV    #COL16,R1    ; 16 COLOR TABLE.
1123 005046 012746 000020      MOV    #16,-(SP)       ; LUT WORDS / COLOR.
1124 005052 000404      SKP2+2
1125 005054 012701 014114  CL64:  MOV    #COL64,R1   ; 64 COLOR TABLE
1126 005060 012746 000004      MOV    #4,-(SP)        ; LUT WORDS / COLOR
1127
1128 005064 005077 175576      CLR    @LSR             ; ADDR 0, NO INTERRUPTS.
1129 005070 011600      1$:   MOV    (SP),R0        ; SET ITERATION K.
1130 005072 012177 175572      MOV    (R1)+,@LDR      ; BLAST THE RAM.
1131 005076 005777 175564      2$:   TST    @LSR        ; WAIT FOR READY.
1132 005102 100375      BPL    -4
1133 005104 105777 175556      TSTB   @LSR            ; LAST ADDRESS DONE ??
1134 005110 001406      BEQ    3$              ; EXIT IF SO.
1135 005112 005300      DEC    R0
1136 005114 001765      BEQ    1$              ; GET NEXT COLOR.
1137 005116 016177 177776 175544  MOV    -2(R1),@LDR     ; REPEAT THIS COLOR.
1138 005124 000764      BR     2$
1139 005126 005726      3$:   TST    (SP)+        ; FIX THE STACK...
1140 005130 000207      RTS    PC              ;...AND RETURN.
1141
1142      ; BLAST 16 SHADES OF THE BASIC COLOR IN (R1).
1143      ; LOCATION "SHADLY" SET BY CALLER TO PRODUCE
1144      ; A PLEASING VISUAL EFFECT.
1145      ;
1146 005132      SHAD16: BREAK
1147 005134 005077 175526      CLR    @LSR            ; ADDR 0, NO INTERRUPTS.
1148 005140 042701 177356      BIC    #^C421,R1      ; SET DIMMEST SHADE THIS COLOR.
1149 005144 005002      CLR    R2              ; 1ST SHADE IS ALWAYS BLACK.
1150 005146 012703 000020      1$:   MOV    #16.,R3     ; 16 LUT WORDS / SHADE.
1151 005152 010277 175512      2$:   MOV    R2,@LDR     ; WRITE DATA.
1152 005156 005777 175504      TST    @LSR
1153 005162 100375      BPL    -4
1154 005164 013700 002732      MOV    SHADLY,R0      ; DELAY.
1155 005170 005300      DEC    R0
1156 005172 001376      BNE    -2
1157 005174 105777 175466      TSTB   @LSR            ; LUT RAM FULL ??
1158 005200 001404      BEQ    3$              ; EXIT IF SO.
1159 005202 005303      DEC    R3              ; THIS SHADE DONE ??
1160 005204 001362      BNE    2$              ; NOT YET, LOOP.
1161 005206 060102      ADD    R1,R2           ; YES, INCREMENT THE SHADE...
1162 005210 000756      BR     1$              ;...AND CONTINUE.
1163 005212 000207      3$:   RTS    PC

```

CZVSVAO COLOUR LOOKUP OPTION
GLOBAL SUBROUTINES SECTION

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1170 005214
1171 005216 012727 005670
1172 005222 005670
1173 005224 005777 175430
1174 005230 100407
1175 005232 004737 005276
1176 005236 005337 005222
1177 005242 001370
1178 005244 000241
1179 005246 000401
1180 005250 000261
1181 005252 000207
1182
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1190
1191 005254 012746 023420
1192 005260 000402
1193 005262 012746 011610
1194 005266 000402
1195 005270 012746 000144
1196 005274 000402
1197 005276 012746 000001
1198 005302 013700 005322
1199 005306 005300
1200 005310 001376
1201 005312 005316
1202 005314 001372
1203 005316 005726
1204 005320 000207
1205
1206 005322 000040

: SUBROUTINE TO WAIT FOR DISPLAY STOP FLAG.
: RETURN WITH 'C' = 1 AS SOON AS STOP OCCURS.
: OTHERWISE, 'C' = 0 AND RETURN AFTER APPROX 300 MSEC.
WAITF: BREAK ; DO A SUPVSR BREAK FIRST.
MOV #3000.,(PC)+ ; 300 MSEC TIMER.
1$: 3000.
2$: TST @DSR
BMI 3$ ; EXIT ON STOP FLAG.
JSR PC,US100 ; OTHERWISE, WAIT 100 USEC...
DEC 1$
BNE 2$ ;...AND TRY AGAIN.
CLC ; C = 0, DPU STILL RUNNING...
SKP1 ;...OR HUNG-UP AFTER 300 MSEC.
3$: SEC ; C = 1, DPU IS STOPPED.
RTS PC

: SUBROUTINES TO PAUSE (WAIT) IN INCREMENTS OF 100 USEC.
: BASED ON AVERAGE TIME (CPU DEPENDANT) TO EXECUTE
: DEC R0
: BNE -2
: DELAY CONSTANT (K100US) SHOULD BE ADJUSTED AS FOLLOWS:
: FOR SLOW CPU'S (11/03 THRU 10), K100US = 8.
: FOR FAST CPU'S (11/34 THRU 70), K100US = 32.
PAUSE1: MOV #10000.,-(SP) ; 1 SEC TIMER.
SKP2
PAUS.5: MOV #5000.,-(SP) ; 1/2 SEC TIMER.
SKP2
PAU.01: MOV #100.,-(SP) ; 10 MSEC TIMER.
SKP2
US100: MOV #1, -(SP) ; 100 USEC TIMER.
1$: MOV K100US,R0
DEC R0
BNE -2 ; 100 USEC (MORE OR LESS) LOOP.
DEC (SP)
BNE 1$ ; VARIABLE LOOP.
TST (SP)+ ; FIX STACK...
RTS PC ;...AND RETURN.

K100US: 32. ; 100 USEC TIMER.

```

CZVSVAO COLOUR LOOKUP OPTION
GLOBAL SUBROUTINES SECTION

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1218 005324 012737 005352 000004
1219 005332
1220 005340 005046
1221 005342 005721
1222 005344 020102
1223 005346 101775
1224 005350 000402
1225 005352 022626
1226 005354 005116
1227
1228 005356
1229 005364 005726
1230 005366 001401
1231 005370 000261
1232 005372 000207
1233
1234
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1236
1237
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1242
1243
1244
1245 005374 005737 002654
1246 005400 100403
1247 005402 005337 005420
1248 005406 001002
1249 005410 000241
1250 005412 000401
1251 005414 000261
1252 005416 000207
1253 005420 000000

: ROUTINE TO TEST FOR A NEXM IN THE RANGE (R1) THRU (R2).
: ON RETURN, IF 'C' = 1, (R1) = NEXM ADDRESS.
: 'C' = 0, ALL ADDRESSES OK.
: CALL: MOV ADR1,R1
: MOV ADR2,R2
: JSR PC,NXM
: RETURN
: TEST 'C' AND PROCEED.
NXM: MOV #2$,@#4 : SET TRAP CATCHER.
GETPRI @#6 : RETAIN CURRENT CPU PRI.
CLR -(SP) : TRAP FLAG.
1$: TST (R1)+ : TEST THE ADDRESS(ES).
CMP R1,R2
BLOS 1$ : NO TRAP -- CONTINUE...
BR 3$ : ...TIL DONE.
2$: CMP (SP)+,(SP)+ : TRAP -- FIX STACK...
COM (SP) : ...SET FLAG...
3$: CLRVEC #4 : GIVE BACK THE VECTOR.
TST (SP)+ : DID ANY TRAP ??
BEQ .+4 : NO, 'C' = 0, SKIP NEXT.
SEC : YES, 'C' = 1, (R1) = BAD ADDR.
RTS PC

: SUBROUTINE TO EXECUTE TEST ITERATIONS.
: EXIT WITH 'C' SET IF LOOPS ALLOWED AND LOOP COUNT NON-ZERO.
: LOOP COUNTER IS SET BY 'BEGIN.TEST' MACRO.
: CALL: LOOPTO ARG
:
: .MACRO LOOPTO TAG
: JSR PC,LOOP
: BCS TAG
: .ENDM LOOPTO
LOOP: TST QVP
BMI 1$ : LOOPS DISALLOWED IN QUICK PASS.
DEC LOOPK : BUMP LOOP COUNTER.
BNE 2$
1$: CLC : LOOP DISALLOWED, OR DONE.
SKP1
2$: SEC : LOOP ENABLED.
RTS PC
LOOPK: 0 : LOOP (ITERATION) COUNTER.

```

CZVSVAO COLOUR LOOKUP OPTION
GLOBAL SUBROUTINES SECTION

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1264 005422 005037 005532
1265 005426 005037 003234
1266 005432 005237 005472
1267 005436 032737 001000 002726
1268 005444 001410
1269 005446
1270 005466 000207
1271 005470 000000
1272 005472 000000
1273
1274
1275
1276
1277 005474 032737 020000 002726
1278 005502 001412
1279 005504
1280 005530 000207
1281
1282 005532 000000
1283 005534 045 101 040
      005537 045 104 045
      005542 101 040 105
      005545 122 122 117
      005550 122 123 000
1284

```

```

: PRINT THE NUMBER AND NAME OF EACH TEST AS WE GO ALONG.
: INCREMENT "TESTK" TO INDICATE THE NUMBER OF TESTS
: IN THE CURRENT RUN SEQUENCE.
: CLEAR THE ERROR COUNTER AND SIGNATURE EXTENSION FLAGS.
:
: *** NOTE: REQUIRES PRIOR USE OF THE 'BEGIN.TEST' MACRO
: TO SET NAME AND NUMBER POINTERS.
:
TSTGO: CLR      ERRK      : CLEAR LOCAL ERROR COUNTER.
      CLR      EXTA      : CLEAR ERROR EXTENSION FLAG.
      INC      TESTK     : BUMP TEST COUNTER.
      BIT      #PNT,FLAGS : BR IF PNT FLAG
      BEQ      1$        : NOT SET
      PRINTF   TNAM      : PRINT THE TEST TITLE.
      RTS      PC
1$:
TNAM: 0
TESTK: 0 : NUMBER OF TESTS RUN THIS PASS.
:
: AT END OF EACH TEST, PRINT THE NUMBER OF ERRORS RECEIVED
: IF NORMAL ERROR REPORTING IS DISABLED (FLA:IER).
:
TSTEND: BIT      #IER,FLAGS
      BEQ      1$        : BR IF "IER" NOT SET.
      PRINTF   #ESUM,ERRK : PRINT ERROR COUNT.
1$:
      RTS      PC
ERRK: 0 : LOCAL ERROR COUNT.
ESUM: .ASCIZ  /%A %D%A ERRORS/
:
      .EVEN

```


CZVSVA0 COLOUR LOOKUP OPTION
GLOBAL SUBROUTINES SECTION

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```

1286
1287      ; SUBROUTINE TO SET-UP VARIOUS ENVIRONMENTAL PARAMETERS.
1288      ;
1289      ENVIRN: MEMORY R0
1290      MOV      R0, FREE      ; GET 1ST FREE ADDRESS...
1291      MOV      (R0), FRESIZ  ; ...AND WORD COUNT.
1292      MOV      #8., K100US  ; ASSUME LSI FOR 100US TIMER.
1293      READBUS
1294      BCOMPLETE 1$
1295      MOV      #32., K100US  ; NOT LSI -- CHANGE TIMER.
1296      MOV      #60., HZ     ; ASSUME 60 HZ SYSTEM.
1297      CLOCK   L, R0
1298      BNCOMPLETE 2$
1299      CLR      @0(R0)       ; INSURE CLOCK IS OFF.
1300      MOV      6(R0), HZ   ; SET ACTUAL FREQUENCY.
1301      2$:     240, 240
1302      RTS      PC
1303      FREE:   0           ; 1ST FREE MEMORY ADDRESS...
1304      FRESIZ: 0          ; ...AND SIZE (IN WORDS).
1305      HZ:     60.        ; LINE FREQUENCY.

```

CZVSVAO COLOUR LOOKUP OPTION
INITIALIZE SECTION

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```

1308          .SBTTL INITIALIZE SECTION
1309
1310          :++
1311          : THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
1312          : AT THE BEGINNING OF EACH PASS.
1313          :--
1314 005652          BGNINIT
1315
1316          : IF "START" OR "RESTART", SET QUICK-PASS FLAG.
1317          : IF "CONTINUE", NOTHING IS REQUIRED.
1318
1319 005652          READEF #EF.START          ; INITIAL START...
1320 005660          BCOMPLETE START          ;
1321 005662          READEF #EF.RESTART       ; ...OR RESTART.
1322 005670          BCOMPLETE START          ;
1323 005672          READEF #EF.NEW          ; BEGIN NEW PASS.
1324 005700          BCOMPLETE NEWPAS       ;
1325 005702          READEF #EF.CONTINUE     ;
1326 005710          BNCOMPLETE NXTU        ; NONE OF THE ABOVE.
1327 005712 000137 006272          JMP      CNTNU          ; CONTINUE (FROM ^C HALT).
1328 005716 012737 177777 002654 START: MOV    #-1,QVP      ; 1ST PASS, SET QUICK VERIFY...
1329 005724 005037 005472          CLR      TESTK         ; ...CLEAR TOTAL TEST COUNT...
1330 005730 004737 005554          JSR     PC,ENVIRN       ; ...AND SET ENVIRONMENT.
1331 005734 000402          SKP2
1332 005736 005037 002654          CLR      QVP           ; NEXT PASS, ALLOW ITERATIONS.
1333 005742 012737 177777 002652 NEWPAS: MOV    #-1,UUT      ; INIT UNIT NUMBER.
1334 005750 023737 002652 002012 NXTU:  CMP    UUT,L$UNIT
1335 005756 001767          BEQ     NEWPAS          ; BR IF ALL UNITS DONE.
1336 005760 005237 002652          INC     UUT           ; OTHERWISE, GET NEXT UNIT...
1337 005764          GPHARD UUT,RO          ; ...P-TABLE POINTER.
1338 005772          BCOMPLETE 1$          ; BR IF UNIT AVAILABLE.
1339 005774 023737 006330 002012 CMP    DEADU,L$UNIT ; ANY UNITS LEFT ??
1340 006002 001362          BNE     NXTU           ; YES, TRY ANOTHER.
1341 006004          DOCLN          ; NO -- ABORT (HALT) !!
1342
1343          : NOW SET A BUNCH OF POINTERS FOR THIS UNIT.
1344          : RO POINTS TO THE CURRENT UNIT'S P-TABLE.
1345
1346 006006 012001          1$:  MOV    (RO)+,R1          ; GET 1ST P-TABLE ENTRY.
1347 006010 010137 002666          MOV    R1,LSR          ; SET LUT CSR...
1348 006014 062701 000002          ADD    #2,R1
1349 006020 010137 002670          MOV    R1,LDR          ; ...DATA...
1350 006024 062701 000002          ADD    #2,R1
1351 006030 010137 002672          MOV    R1,LMR          ; ...AND MAINT ADDRESSES.
1352
1353 006034 012001          MOV    (RO)+,R1          ; GET VECTOR ADDRESS...
1354 006036 012037 002674          MOV    (RO)+,DPRI       ; ...AND PRIORITY.
1355 006042 010137 002706          MOV    R1,L!TV
1356 006046 012721 004652          MOV    #LDUN,(R1)+    ; AND SET UP THE VECTOR.
1357 006052 013721 002674          MOV    DPRI,(R1)+
1358 006056 012001          MOV    (RO)+,R1          ;
1359 006060 010137 002656          MOV    R1,DPC         ; SET DISPLAY PC ADDRESS
1360 006064 062701 000002          ADD    #2,R1
1361 006070 010137 002660          MOV    R1,DSR        ; SET DISPLAY STATUS REG
1362 006074 062701 000002          ADD    #2,R1
1363 006100 010137 002662          MOV    R1,DXR        ; DISP X POSN REG
1364 006104 062701 000002          ADD    #2,R1

```

CZVSVAO COLOUR LOOKUP OPTION
INITIALIZE SECTION

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```

1365 006110 010137 002664      MOV      R1,DYR      ; DISP Y POSN REG
1366 006114 012001              MOV      (R0)+,R1   ; GET VS11 VECTOR
1367 006116 010137 002676      MOV      R1,STPV    ; SET UP FIRST VEVTOR
1368 006122 012721 004604      MOV      #DSTP,(R1)+
1369 006126 013721 002674      MOV      DPRI,(R1)+
1370 006132 010137 002700      MOV      R1,JSMV    ; SECOND VECTOR
1371 006136 012721 004610      MOV      #DJM,(R1)+
1372 006142 013721 002674      MOV      DPRI,(R1)+
1373 006146 010137 002702      MOV      R1,TOTV    ; THIRD VECTOR
1374 006152 012721 004556      MOV      #DIO,(R1)+
1375 006156 013721 002674      MOV      DPRI,(R1)+
1376 006162 010137 002704      MOV      R1,JSSV    ; LAST VECTOR
1377 006166 012721 004614      MOV      #DJS,(R1)+
1378 006172 013721 002674      MOV      DPRI,(R1)+
1379 006176 005737 002654      TST      QVP        ; 1ST PASS ??
1380 006202 001002              BNE      2$         ; SKIP NEXT IF SO.
1381 006204 000137 006272      JMP      CNTNU      ; OTHERWISE, SKIP INITIALIZATION.
1382
1383      ; ON 1ST (QV) PASS, VERIFY THAT THE LUT ADDRESSES ARE OK.
1384      ; AND THE DATA PROCESSOR (VS11) ADDRESSES ARE OK
1385      ; IF ANY ADDRESS IS NOT THERE, REPORT ERROR
1386
1387 006210 005037 003234      2$:      CLR      EXTA      ; CLEAR ERROR EXTENSION FLAG.
1388 006214 013701 002666      MOV      LSR,R1
1389 006220 013702 002672      MOV      LMR,R2
1390 006224 004737 005324      JSR      PC,NXM
1391 006230 103010              BCC      4$
1392 006232              ; TEST LUT REGISTERS...
1393 006242              ; ...AND BR IF ALL OK.
1394 006250 000637      3$:      ERRDF  1,NXR,NXRERR ; NEXM REGISTER ERROR.
1395              ; AUTO-DROP THIS UNIT...
1396 006252 013701 002656      DODU    UUT
1397 006256 013702 002664      BR      NXTU      ; ...AND GO FOR ANOTHER.
1398 006262 004737 005324      4$:      MOV      DPC,R1      ; GET DPU ADDRESS.
1399 006266 103001              MOV      DYR,R2      ; LAST DPU ADDRESS.
1400 006270 000760              JSR      PC,NXM      ; TEST THE REGISTERS
1401              ; CONTINUE IF OK
1402              ; ELSE, REPORT ERROR
1403 006272 012737 177777 002730 CNTNU: MOV      #-1,LUTAV    ; FOR COMPATABILITY ONLY.
1404 006300              RFLAGS  FLAGS      ; GET FLAG REGISTER (SWR).
1405 006306              SETPRI  #PRI00     ; LOWER THE RUN PRIORITY...
1406 006314              ENDINIT          ; ...AND START 'EM UP.
1407
1408      ; THIS SECTION IS FOR LOAD DEVICE PROTECTION.
1409
1410 006316              BGNPROT
1411 006316 177777 177777 177777      -1, -1, -1      ; NO DEVICE PROTECTION REQUIRED.
1412 006324              ENDPROT

```

CZVSVAO COLOUR LOOKUP OPTION
DROP AND ADD UNITS SECTIONS

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1414          .SBTTL  DROP AND ADD UNITS SECTIONS
1415
1416          :++
1417          : AUTO-DROP CODE SECTION.
1418          :--
1419 006324      BGNAUTO
1420 006324      ENDAUTO          ; UNUSED.
1421
1422          :++
1423          : THE DROP-UNIT SECTION CONTAINS OPTIONAL CODING TO BE EXECUTED
1424          : FOLLOWING THE REMOVAL (DROP) OF A DEVICE FROM THE TEST LIST.
1425          :
1426          : 'DROPPED' UNITS ARE RE-SELECTED ON OPERATOR 'STA' OR 'ADD'
1427          : COMMAND, OTHERWISE REMAIN INACTIVE.  THE 'DISPLAY' COMMAND
1428          : WILL PRINT THE P-TABLES OF ALL UNITS AND SHOW WHICH ARE
1429          : DROPPED WHICH ARE STILL ACTIVE.
1429          :--
1430 006326      BGNDU
1431 006326      005227      INC      (PC)+          ; KEEP TOTAL NUMBER OF...
1432 006330      000000      DEADU:  0              ; ...UNITS DROPPED HERE.
1433 006332      023737      006330  002012      CMP      DEADU,L$UNIT
1434 006340      003404      BLE      1$
1435 006342      013737      002012  006330      MOV      L$UNIT,DEADU      ; DON'T DROP MORE THAN WE HAVE.
1436 006350      000423      BR      3$          ; JUST GO AWAY.
1437 006352      PRINTF     #2$
1438 006372      000412      BR      3$
1439 006374      045        101        040      2$:  .ASCIZ  /%A  UNIT DROPPED%N/
          006377      040        125        116
          006402      111        124        040
          006405      104        122        117
          006410      120        120        105
          006413      104        045        116
          006416      000
1440
1441 006420      .EVEN
1442          3$:  ENDDU
1443          :++
1444          : THE ADD-UNIT SECTION CONTAINS OPTIONAL CODING TO BE EXECUTED
1445          : FOLLOWING THE ADDITION OF A DEVICE TO THE TEST LIST.
1445          :--
1446 006422      BGNAU
1447 006422      005337      006330      DEC      DEADU          ; ADJUST DEAD UNIT COUNTER.
1448 006426      100003      BPL      1$
1449 006430      005037      006330      CLR      DEADU          ; CAN'T ADD MORE THAN WE HAD...
1450 006434      000422      BR      3$          ; ...TO START WITH.
1451 006436      PRINTF     #2$
1452 006456      000411      BR      3$
1453 006460      045        101        040      2$:  .ASCIZ  /%A  UNIT ADDED%N/
          006463      040        125        116
          006466      111        124        040
          006471      101        104        104
          006474      105        104        045
          006477      116        000
1454
1455 006502      .EVEN
          3$:  ENDAU

```

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 31
 CLEAN-UP AND REPORT CODING SECTIONS

```

1457          .SBTTL  CLEAN-UP AND REPORT CODING SECTIONS
1458
1459          :++
1460          : THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS
1461          : EXECUTED AT THE END OF EACH PASS (OR SUB-PASS).
1462          : USE TO RETURN DEVICE UNDER TEST TO A NEUTRAL STATE.
1463          :--
1464 006504          BGNCLN
1465 006504 005737 002656      TST      DPC
1466 006510 001404          BEQ      1$          ; BR IF NO DPU INSTALLED.
1467 006512 004737 004766      JSR      PC,RELEAS ; CHECK FOR 'HUNG' DPU.
1468 006516 004737 004702      JSR      PC,CLRW   ; CLEAR IM'S, VIDEO OFF.
1469 006522 005077 174140      CLR      @LSR     ; CLEAR LUT STATUS.
1470 006526          1$:      ENDCLN
1471          :++
1472          :
1473          :
1474          :
1475 006530          BGNRPT
1476          :
1477          :
1478 006530          ENDRPT          ; NO USED

```

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1486 006532
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1492 006570 004737 005422
1493 006574 005077 174066
1494 006600 005037 002720
1495 006604 012777 012000 174054
1496 006612 005777 174050
1497 006616 100375
1498 006620 005737 002720
1499 006624 001006
1500 006626 005237 005532
1501 006632
1502 006642 005037 002720
1503 006646 005077 174016
1504 006652 005777 174010
1505 006656 100375
1506 006660 005737 002720
1507 006664 001006
1508 006666 005237 005532
1509 006672
1510 006702 005037 002720
1511 006706 042777 002000 173752
1512 006714 052777 010000 173744
1513 006722 005777 173740
1514 006726 100375
1515 006730 005737 002720
1516 006734 001406
1517 006736 005237 005532
1518 006742
1519 006752 005037 002720
1520 006756 005077 173706
1521 006762 005777 173700
1522 006766 100375
1523 006770 005737 002720
1524 006774 001406
1525 006776 005237 005532
1526 007002
1527 007012
1528
1529
1530
1531
1532
1533
1534 007020
1535
1536 007022

.SBTTL
.SBTTL HARDWARE TEST SECTION.
.SBTTL
.SBTTL TEST 1 LOOK-UP-TABLE LOGIC TEST
:*****
      BEGIN.TEST <LOGIC TEST>,40
:*****
:
: FIRST, CHECK THE READY BIT AND THE INTERRUPT FUNCTIONS.
: REPEAT THE INTERRUPT TESTS 40 TIMES AFTER QUICK PASS.
:
LUTTST: JSR      PC,TSTGO      ; TITLE
1$:      CLR      @LSR         ; CLEAR STATUS REGISTER.
          CLR      ILSR        ; USE AS INT REC'D FLAG.
          MOV      #LREAD!LDI,@LSR ; READ LOC 0, INT WHEN DONE.
          TST      @LSR
          BPL      -4
          TST      ILSR
          BNE      2$          ; BR IF INTERRUPT RECEIVED.
          INC      ERRK        ; OTHERWISE...
          HRDERR   NLRI,LINTER ; ...ERROR.
2$:      CLR      ILSR
          CLR      @LDR        ; WRITE LOC 1, INT WHEN DONE.
          TST      @LSR
          BPL      -4
          TST      ILSR
          BNE      3$          ; BR IF INTERRUPT RECEIVED.
          INC      ERRK        ; OTHERWISE...
          HRDERR   NLWI,LINTER ; ...ERROR.
3$:      CLR      ILSR
          BIC      #LDI,@LSR   ; NOW, TURN INTERRUPTS OFF.
          BIS      #LREAD,@LSR ; READ LOC 2.
          TST      @LSR
          BPL      -4
          TST      ILSR
          BEQ      4$          ; BR IF INTERRUPT NOT RECEIVED.
          INC      ERRK        ; OTHERWISE...
          HRDERR   ULRI,LINTER ; ...ERROR.
4$:      CLR      ILSR
          CLR      @LDR        ; WRITE LOC 3.
          TST      @LSR
          BPL      -4
          TST      ILSR
          BEQ      5$          ; BR IF INTERRUPT NOT RECEIVED.
          INC      ERRK        ; OTHERWISE...
          HRDERR   ULWI,LINTER ; ...ERROR.
5$:      LOOPTO   1$          ; REPEAT 'TIL LOOPER EXPIRES...
          ; ...THEN FALL THRU.
:
: NOW TEST THAT THE LUT ADDRESS AUTO-INCREMENTS CORRECTLY.
: DO ALTERNATE READS AND WRITES (WITHOUT INTERRUPTS)
: OVER THE FULL LUT ADDRESS RANGE.
:
BGNSUB      ; ***START SUBTEST 1.1***
:
LUTAI: BREAK

```

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 32-1
 TEST 1 LOOK-UP-TABLE LOGIC TEST

```

1537 007024 005077 173636          CLR    @LSR          ; START AT LUT ADDR 0.
1538 007030 005001                   CLR    R1            ;
1539 007032 005201                   INC    R1            ; SET EXPECTED RETURN.
1540 007034 052777 010000 173624 1$:  BIS    #LREAD,@LSR  ; READ A LOCATION.
1541 007042 005777 173620          TST    @LSR          ; TEST FOR READY...
1542 007046                   BREAK
1543 007050 100374                   BPL    .-6           ; ...WHEN READY.
1544 007052 017702 173610          MOV    @LSR,R2       ; GET RESULT...
1545 007056 042702 177400          BIC    #^C377,R2
1546 007062 120201                   CMPB   R2,R1
1547 007064 001410                   BEQ    3$            ; BR IF IT'S RIGHT.
1548 007066 005237 005532          INC    ERRK
1549 007072                   HRDERR LAIER,LRWERR
1550 007102 010177 173560          2$:  MOV    R1,@LSR    ; CORRECT CSR AFTER ERROR.
1551 007106 005201                   3$:  INC    R1            ; SET NEXT EXPECTED ADDRESS.
1552 007110 005077 173554          CLR    @LDR          ; WRITE THE NEXT LOC.
1553 007114 005777 173546          TST    @LSR          ; TEST FOR READY...
1554 007120                   BREAK
1555 007122 100374                   BPL    .-6           ; ...WHEN READY.
1556 007124 017702 173536          MOV    @LSR,R2       ; GET RESULT...
1557 007130 042702 177400          BIC    #^C377,R2
1558 007134 120201                   CMPB   R2,R1
1559 007136 001410                   BEQ    5$
1560 007140 005237 005532          INC    ERRK
1561 007144                   HRDERR LAIEW,LRWERR
1562 007154 010177 173506          4$:  MOV    R1,@LSR    ; CORRECT CSR AFTER ERROR.
1563 007160 105777 173502          5$:  TST@   @LSR        ; FULL ADDRESS RANGE DONE ??
1564 007164 001322                   BNE    1$            ; LOOP IF NOT.
1565
1566 007166                   ; ENDSUB
1567
1568                   ; NOW CHECK THE CLEAR/SET FUNCTION.
1569
1570 007170                   ; BGNSUB
1571
1572 007172                   ; LUTCLR: BREAK
1573 007174 005001                   CLR    R1            ; SET EXPECTED DATA.
1574 007176 010103                   1$:  MOV    R1,R3       ; USE R3 FOR THE "SET" COMMAND.
1575 007200 052703 010000          BIS    #LSET,R3
1576 007204 005077 173456          CLR    @LSR          ; LUT ADDRESS 0, NO INTERRUPTS.
1577 007210 010377 173454          MOV    R3,@LDR       ; SET ALL LUT ADDRESSES TO (R3).
1578 007214 005777 173446          TST    @LSR
1579 007220 100375                   BPL    .-4           ; WAIT 'TIL DONE.
1580 007222 005077 173440          CLR    @LSR          ; RESET TO ADDR 0.
1581 007226 052777 010000 173432 2$:  BIS    #LREAD,@LSR  ; READ 1ST/NEXT LOCATION.
1582 007234 005777 173426          TST    @LSR
1583 007240 100375                   BPL    .-4           ;
1584 007242 017702 173422          MOV    @LDR,R2       ; GET REC'D DATA.
1585 007246 042702 170000          BIC    #^C777,R2     ; MASK DATA BITS.
1586 007252 020102                   CMP    R1,R2
1587 007254 001406                   BEQ    3$            ; BR IF DATA OK.
1588 007256 005237 005532          INC    ERRK
1589 007262                   HRDERR LDINC,LRWERR
1590 007272 105777 173370          3$:  TST@   @LSR        ; LAST ADDRESS TESTED ??
1591 007276 001353                   BNE    2$            ; CONTINUE READING IF NOT.
1592 007300 006301                   ASL    R1            ; SLIDE EXP'D DATA TO THE LEFT.
1593 007302 032701 010000          BIT    #BIT12,R1

```

CZVSVA0 COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 32-2
 TEST 1 LOOK-UP-TABLE LOGIC TEST

```

1594 007306 001001          BNE      4$          ; SKIP NEXT WHEN BIT 12 IS SET.
1595 007310 005201          INC      R1           ; ELSE, INSERT ANOTHER BIT.
1596 007312 042701 170000  4$:  BIC      #^C7777,R1 ; MASK NEW EXP'D DATA.
1597 007316 001327          BNE      1$          ; LOOP 'TIL WE RETURN TO 0.
1598
1599 007320          : ENDSUB
1600          :
1601          : FINALLY, BLAST THE LUT TO THE GREY-SCALE TABLE AND CHECK IT.
1602          :
1603 007322          : BGNSUB          ; ***START SUBTEST 1.3***
1604          :
1605 007324          : LUTGSD: BREAK
1606 007326 004737 005016    JSR      PC,LUMIN    ; BLAST GREY-SCALE DATA.
1607 007332 012703 013026    MOV      #LUMTBL,R3 ; TABLE POINTER
1608 007336 005077 173324    CLR      @LSR       ; START AT ADDR 0.
1609 007342 012301          1$:  MOV      (R3)+,R1  ; SET EXPECTED DATA.
1610 007344 052777 010000 173314  BIS      #LREAD,@LSR ; XCT READ COMMAND.
1611 007352 005777 173310    TST      @LSR
1612 007356 100375          BPL      -4
1613 007360 017702 173304    MOV      @LDR,R2    ; GET DATA
1614 007364 042702 170000    BIC      #^C7777,R2
1615 007370 020102          CMP      R1,R2
1616 007372 001406          BEQ      2$          ; BR IF DATA OK
1617 007374 005237 005532    INC      ERRK
1618 007400          HRDERR  LDINC,LRWERR
1619 007410 105777 173252    2$:  TSTB   @LSR      ; LAST LUT ADDRESS DONE ??
1620 007414 001352          BNE      1$          ; LOOP IF NOT.
1621
1622 007416          : ENDSUB
1623          :
1624 007420 005077 173242    CLR      @LSR       ; YES, CLEAR LUT STATUS...
1625 007424 004737 005474    JSR      PC,TSTEND ; ...AND QUIT.
1626 007430          : ENDTST

```


CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 33
TEST 2 MAINTENANCE REGISTER BIT TEST

1628
1629
1630
1631 007432
1632
1633
1634
1635
1636
1637 007502 004737 005422
1638 007506 005001
1639 007510 010177 173156
1640 007514 004737 005262
1641 007520 017702 173146
1642 007524 042702 177474
1643 007530 120201
1644 007532 001406
1645 007534 005237 005532
1646 007540
1647
1648 007550 020127 000003
1649 007554 002002
1650 007556 005201
1651 007560 000753
1652 007562 062701 000100
1653
1654 007566 020127 000400
1655 007572 002746
1656 007574 005077 173072
1657 007600 004737 005474
1658 007604
1659
1660
1661

```
.SBTTL TEST 2 MAINTENANCE REGISTER BIT TEST
:
:*****
: BEGIN TEST <MAINTENANCE BIT TESTS>
:*****
:
: BITS 00,01,06 AND 07 OF THE MAINTENANCE REGISTER ARE
: TESTED TO SEE IF THEY CAN BE WRITTEN AND READ BACK CORRECTLY.
:
MAINT: JSP PC,TSTGO
: CLEAR R1
:
1$: CLR R1 : LOAD MAINTENANCE REG
: MOV R1,@LMR : WAIT A WHILE.
: JSR PC,PAUS.5 : READ MAINTENANCE REG
: MOV @LMR,R2 : MASK OF BITS NOT TESTED
: BIC #177474,R2 : ARE THEY THE SAME ?
: CMPB R2,R1 : IF YES, CONTINUE
: BEQ 2$ : ELSE, INCREMENT ERROR COUNT
: INC ERRK : AND REPORT ERROR
: HRDERR MAIER,MRWERR
:
2$: CMP R1,#3 : BITS 00 AND 01 TESTED ?
: BGE 3$ : IF YES, DO BITS 06 AND 07
: INC R1 : ELSE, CONTINUE
: BR 1$
:
3$: ADD #100,R1 : INCREMENT BITS 6 AND 7
:
: CMP R1,#400 : ALL DONE ?
: BLT 1$ : NO, CONTINUE
: CLR @LMR : YES, CLEAR MAINTENANCE REG
: JSR PC,TSTEND : AND EXIT TEST.
:
: ENDTST
```

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 34
TEST 3 LOOK-UP-TABLE ANALOG VERIFICATION

```

1663 .SBTTL TEST 3 LOOK-UP-TABLE ANALOG VERIFICATION
1664
1665 ;*****
1666 007606 ; BEGIN.TEST <ANALOG VERIFICATION USING MAINT REGISTER>
1667 ;*****
1668
1669 ; RUN ALL DACS THRU THEIR FULL INPUT RANGE AND MONITOR THE
1670 ; MAINTENANCE THRESHOLD CROSS-OVER POINTS.
1671 ; MDAC LEVELS ARE: 0.07, 0.42, 1.00, AND 1.35.
1672 ; DO EACH DAC TWICE -- GAMMA ON VS GAMMA OFF.
1673
1674 007702 004737 005422 LUTGAV: JSR PC,TSTGO
1675 007706 004737 004712 JSR PC,CLRRW ; CLEAR IM'S.
1676 007712 004737 005214 JSR PC,WAITF
1677 007716 012737 004540 004554 1$: MOV #GON,GCX ; INIT GAMMA ON TEXT...
1678 007724 005037 010544 CLR GCBIT ; ...AND TOGGLE SUBROUTINE.
1679 007730 012737 000455 003224 MOV #EN+1,ERRNBR ; SET UP ERROR TABLE.
1680 007736 012737 000002 003222 MOV #2,ERRTYP ; 2 = HARD ERROR.
1681 007744 012737 003120 003230 MOV #DACERR,ERRBLK ; SIGNATURE POINTER.
1682
1683 007752 012701 000017 RED1: MOV #17,R1 ; RED DAC RANGE 0-17...
1684 007756 012702 000001 MOV #1,R2 ; ...DELTA 1.
1685 007762 012703 011136 MOV #RDAC,R3 ; POINT TO RED DAC BUFFER.
1686 007766 012704 000020 MOV #REDC,R4 ; SET RED DAC TEST BIT.
1687 007772 012737 004227 003226 MOV #RDERR,ERRMSG
1688 010000 012737 010550 003234 MOV #REDSUM,EXTA
1689 010006 004737 010212 JSR PC,TSTDAC ; TEST RED DAC.
1690 010012 004737 010512 1$: JSR PC,GAMMA ; TOGGLE GAMMA BIT...
1691 010016 001355 BNE RED1 ; ...AND DO IT AGAIN.
1692
1693 010020 012701 000360 GRN1: MOV #360,R1 ; GREEN DAC RANGE 0-360...
1694 010024 012702 000020 MOV #20,R2 ; ...DELTA 20 (1 GREEN BIT).
1695 010030 012703 011146 MOV #GDAC,R3 ; POINT TO GREEN DAC BUFFER.
1696 010034 012704 000010 MOV #GRNC,R4 ; GRN DAC TEST BIT.
1697 010040 012737 004247 003226 MOV #GDERR,ERRMSG
1698 010046 012737 010562 003234 MOV #GRNSUM,EXTA
1699 010054 004737 010212 JSR PC,TSTDAC ; TEST GREEN DAC.
1700 010060 004737 010512 1$: JSR PC,GAMMA
1701 010064 001355 BNE GRN1
1702
1703 010066 012701 007400 BLU1: MOV #7400,R1 ; BLUE DAC RANGE 0-7400...
1704 010072 012702 000400 MOV #400,R2 ; ...DELTA 400 (1 BLUE BIT).
1705 010076 012703 011156 MOV #BDAC,R3 ; POINT TO BLUE DAC BUFFER.
1706 010102 012704 000004 MOV #BLUC,R4 ; BLUE DAC TEST BIT.
1707 010106 012737 004271 003226 MOV #BDERR,ERRMSG
1708 010114 012737 010574 003234 MOV #BLUSUM,EXTA
1709 010122 004737 010212 JSR PC,TSTDAC ; TEST BLUE DAC.
1710 010126 004737 010512 1$: JSR PC,GAMMA
1711 010132 001355 BNE BLU1
1712
1713 010134 012701 007777 CMP1: MOV #7777,R1 ; COMPOSITE RANGE 0-7777...
1714 010140 012702 000421 MOV #421,R2 ; ...DELTA 421 (1R, 1G, AND 1B).
1715 010144 012703 011166 MOV #CDAC,R3 ; POINT TO COMPOSITE BUFFER.
1716 010150 012704 000040 MOV #CVC,R4 ; COMPOSITE DAC TEST BIT.
1717 010154 012737 004312 003226 MOV #CDERR,ERRMSG
1718 010162 012737 010606 003234 MOV #CMPSUM,EXTA
1719 010170 004737 010212 JSR PC,TSTDAC ; TEST COMPOSITE VIDEO DAC.

```

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 34-1
 TEST 3 LOOK-UP-TABLE ANALOG VERIFICATION

```

1720 010174 004737 010512      1$:   JSR   PC,GAMMA
1721 010200 001355              BNE   CMP1
1722
1723 010202 004737 005474      JSR   PC,TSTEND
1724 010206              EXIT  TST
1725
1726      : SUBROUTINE TO TEST THE DACS.
1727      : (R1) = MAX LUT DATA FOR THIS DAC, (R2) = DATA INCREMENT.
1728      : (R3) = DATA BUFFER POINTER, (R4) = MDAC COMPARE BIT.
1729      : BLAST THE LUT TO THE APPROPRIATE DATA, WAIT, THEN
1730      : SEE IF DAC OUPUT EXCEEDS THRESHOLD.
1731      : IF SO, SAVE CROSSOVER VALUE, AND INCREASE THRESHOLD.
1732      : CONTINUE OVER THE ENTIRE DAC INPUT RANGE.
1733      : THEN TEST THE OBSERVED VALUES AGAINST THOSE EXPECTED.
1734
1735 010212 010105      TSTDAC: MOV   R1,R5           ; MOVE MAX OVER TO R5.
1736 010214 010246      MOV   R2,-(SP)        ; SAVE DELTA...
1737 010216 010346      MOV   R3,-(SP)        ; ...AND POINTER ON STACK.
1738 010220 012701 177777  MOV   #-1,R1
1739 010224 010123      MOV   R1,(R3)+       ; NULL THE RECEIVING BUFFER.
1740 010226 010123      MOV   R1,(R3)+
1741 010230 010123      MOV   R1,(R3)+
1742 010232 010123      MOV   R1,(R3)+
1743 010234 011603      MOV   (SP),R3        ; AND RESET THE POINTER.
1744 010236 005001      CLR   R1             ; USE (R1) AS CURRENT DATA...
1745 010240 005002      CLR   R2             ; ...AND (R2) AS MDAC THRESHOLD...
1746 010242 053702 010544  BIS   GCBIT,R2        ; ...WITH GAMMA ON/OFF.
1747 010246 005077 172414  1$:   CLR   @LSR          ; SET LUT ADDRESS 0.
1748 010252 010277 172414  MOV   R2,@LMR         ; SET MDAC THRESHOLD.
1749 010256 012700 010000  MOV   #LSET,R0        ; USE "SETALL" FUNCTION...
1750 010262 050100      BIS   R1,R0          ; ...INSERT DATA BITS...
1751 010264 010077 172400  MOV   R0,@LDR         ; ...AND BLAST AWAY !!!
1752 010270 005777 172372  2$:   TST   @LSR
1753 010274              BREAK
1754 010276 100374      BPL   2$             ; WAIT FOR READY
1755 010300 004737 005262  JSR   PC,PAUS.5       ; WAIT A BIT FOR MAINT DAC
1756 010304 030477 172362  BIT   R4,@LMR         ; DAC OUT > THRESHOLD ???
1757 010310 001405      BEQ   3$             ; BR IF NOT.
1758 010312 010123      MOV   R1,(R3)+       ; YES, SAVE CROSSOVER VALUE...
1759 010314 005202      INC   R2             ; ...AND SET NEXT THRESHOLD.
1760 010316 032702 000003  BIT   #3,R2          ; 4 TRANSITIONS DONE ??
1761 010322 001404      BEQ   4$             ; CHECK RESULTS IF SO.
1762 010324 066601 000002  3$:   ADD   2(SP),R1      ; NO, INCREMENT INPUT DATA.
1763 010330 020105      CMP   R1,R5          ; INPUT LEVEL MAX ??
1764 010332 101745      BLOS  1$             ; NOT YET, CONTINUE.
1765 010334 012601      4$:   MOV   (SP)+,R1      ; NOW RECALL BUFFER POINTER...
1766 010336 012600      MOV   (SP)+,R0      ; ...AND DELTA (TOLERANCE).
1767 010340 005737 002516  TST   @#TOL          ; IF TOL = 0
1768 010344 001402      BEQ   GONOGO        ; CHECK RESULTS, USING "GO-NOGO".
1769 010346 000137 010420  JMP   TOLER          ; ELSE, "JMP TOLER" TO TEST...
1770
1771      : ***** GO-NOGO TEST *****
1772 010352 012737 004421 004552 GONOGO: MOV   #DACX2,DACX      ; POINT TO GO-NOGO MESSAGE.
1773 010360 012737 000456 003224  MOV   #EN+2,ERRNBR   ; SET ERROR NUMBER 2 FOR GO-NOGO
1774 010366 012702 000C04  MOV   #4,R2          ; ALL WE CARE ABOUT IS THAT WE...
1775 010372 022127 177777  1$:   CMP   (R1)+,#-1     ; ...CROSS ALL 4 MAINT THRESHOLDS.
1776 010376 001403      BEQ   2$             ; IF NOT -- ERROR.
    
```

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 34-2
 TEST 3 LOOK-UP-TABLE ANALOG VERIFICATION

```

1777 010400 005302          DEC      R2
1778 010402 001373          BNE     1$
1779 010404 000401          SKP1
1780 010406                2$:      ERROR
1781 010410 000240 000240 000240 240,240,240
1782 010416 000207          RTS     PC
1783
:***** TOLERANCE TEST *****
1784 010420 012737 004340 004552 TOLER: MOV     #DACX1,DACX ; POINT TO VALUE INCORRECT MESSAGE
1785 010426 010102          MOV     R1,R2
1786 010430 062702 000040          ADD     #40,R2 ; SET SPEC DATA POINTER...
1787 010434 012703 000004          MOV     #4,R3 ; ...AND LOOP COUNT.
1788 010440 005737 010544          TST     GCBIT
1789 010444 001402          BEQ     1$ ; BR IF GAMMA ON.
1790 010446 062702 000040          ADD     #40,R2 ; OTHERWISE, ADJUST POINTER.
1791 010452 012204          1$:    MOV     (R2)+,R4
1792 010454 162104          SUB     (R1)+,R4 ; SPEC - OBSERVED.
1793 010456 001405          BEQ     3$ ; BR IF NO DIFFERENCE.
1794 010460 000240          NOP
1795 010462 100001          BPL     2$ ; *** BR 4$ (407) TO DISABLE TOL ***
1796 010464 005404          NEG     R4 ; MAKE ABS DIFFERENCE...
1797 010466 160004          2$:    SUB     R0,R4 ; ... -1 BIT TOLERANCE.
1798 010470 003003          BGT     4$ ; *** TOLERANCE EXCEEDED ***
1799 010472 005303          3$:    DEC     R3
1800 010474 001366          BNE     1$
1801 010476 000401          SKP1
1802 010500          4$:    ERROR
1803 010502 000240 000240 000240 240,240,240
1804 010510 000207          RTS     PC
1805
: SUBROUTINE TO TOGGLE THE GAMMA BIT AND TEXT POINTER.
1806
: GAMMA:
1807
1808 010512 012700 000100          MOV     #GCOFF,R0
1809 010516 074037 010544          XOR     R0,GCBIT ; TOGGLE GAMMA ON/OFF.
1810 010522 001404          BEQ     1$ ; BR IF 'ON'.
1811 010524 012737 004545 004554          MOV     #GOFF,GCX ; POINT TO 'OFF'.
1812 010532 000403          SKP3
1813 010534 012737 004540 004554 1$:    MOV     #GON,GCX ; POINT TO 'ON'.
1814 010542 005727          TST     (PC)+
1815 010544 000000          GCBIT: 0
1816 010546 000207          RTS     PC
1817
: ON ANY ERROR, THESE EXTENSIONS SHOW EXP'D VS REC'D.
1818
: REDSUM:
1819
1820 010550 012701 011176          MOV     #RSPEC,R1
1821 010554 012702 011136          MOV     #RDAC,R2
1822 010560 000404          SKP2+2
1823 010562 012701 011206          GRNSUM: MOV     #GSPEC,R1
1824 010566 012702 011146          MOV     #GDAC,R2
1825 010572 000404          SKP2+2
1826 010574 012701 011216          BLUSUM: MOV     #BSPEC,R1
1827 010600 012702 011156          MOV     #BDAC,R2
1828 010604 000404          SKP2+2
1829 010606 012701 011226          CMPSUM: MOV     #CSPEC,R1
1830 010612 012702 011166          MOV     #CDAC,R2
1831
1832 010616 005237 005532          INC     ERRK ; BUMP ERROR COUNT.
1833 010622 005737 010544          TST     GCBIT

```

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 34-3
 TEST 3 LOOK-UP-TABLE ANALOG VERIFICATION

```

1834 010626 001402          BEQ      .+6          : SKIP NEXT IF GAMMA ON.
1835 010630 062701 000040  ADD      #40,R1      : OTHERWISE, ADJUST SPEC PTR.
1836 010634 010137 010662  MOV      R1,1$      : SET EXPECTED...
1837 010640 010237 010672  MOV      R2,2$      : ...AND RECEIVED POINTERS.
1838 010644 004537 010676  JSR      R5,D04     : PRINT THRESHOLDS.
1839 010650 010766 000000  THRSR,0
1840 010654 004537 010676  JSR      R5,D04     : PRINT 'EXPECTED' DATA.
1841 010660 011047          EXP
1842 010662 000000          0
1843 010664 004537 010676  JSR      R5,D04     : PRINT 'RECEIVED 'DATA.
1844 010670 011070          REC
1845 010672 000000          0
1846 010674 000207          RTS      PC
1847
1848 010676          D04: PRINTX (R5)+      : PRINT TEXT.
1849 010714 012501          MOV      (R5)+,R1    : GET DATA POINTER...
1850 010716 001422          BEQ      3$          : ...RETURN IF NONE.
1851 010720 012702 000004  MOV      #4,R2
1852 010724 012703 011111  JSR      #DATA,R3   : ASSUME VALID DATA.
1853 010730 005711          TST      (R1)
1854 010732 100002          BPL      2$          : SKIP NEXT IF SO.
1855 010734 012703 011123  MOV      #NULL,R3
1856 010740          2$: PRINTX R3,(R1)+    : PRINT DATA (OR NULL)...
1857 010760 005302          DEC      R2
1858 010762 001360          BNE     1$
1859 010764 000205          3$: RTS      R5
1860
1861 010766          045 116 045 THRSR: .ASCIZ /%N%A THRESHOLD: 0.07V 0.42V 1.00V 1.35V/
      010771          101 040 040
      010774          124 110 122
      010777          105 123 110
      011002          117 114 104
      011005          072 040 040
      011010          040 060 056
      011013          060 067 126
      011016          040 040 040
      011021          060 056 064
      011024          062 126 040
      011027          040 040 061
      011032          056 060 060
      011035          126 040 040
      011040          040 061 056
      011043          063 065 126
      011046          000
1862 011047          045 116 045 EXP: .ASCIZ /%N%A EXPECTED:/
      011052          101 040 040
      011055          040 105 130
      011060          120 105 103
      011063          124 105 104
      011066          072 000
1863 011070          045 116 045 REC: .ASCIZ /%N%A RECEIVED:/
      011073          101 040 040
      011076          040 122 105
      011101          103 105 111
      011104          126 105 104
      011107          072 000
1864 011111          045 101 040 DATA: .ASCIZ /%A %04/
    
```

CZVSVA0 COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 34-4
TEST 3 LOOK-UP-TABLE ANALOG VERIFICATION

	011114	040	040	040	
	011117	045	117	064	
	011122	000			
1865	011123	045	101	040	NULL: .ASCIZ /%A ----/
	011126	040	040	040	
	011131	055	055	055	
	011134	055	000		

1866						
1867						
1868	011136	000000	000000	000000	.EVEN ; RECEIVED DAC CROSS-OVER POINTS. RDAC: .WORD 0,0,0,0	
	011144	000000				
1869	011146	000000	000000	000000	GDAC: .WORD 0,0,0,0	
	011154	000000				
1870	011156	000000	000000	000000	BDAC: .WORD 0,0,0,0	
	011164	000000				
1871	011166	000000	000000	000000	CDAC: .WORD 0,0,0,0	
	011174	000000				

1872						
1873	011176	000001	000002	000004	. GAMMA ON CROSS-OVER SPECS. RSPEC: .WORD 0001,0002,0004,0010	; RED FIELD <3:0>.
	011204	000010				
1874	011206	000020	000040	000100	GSPEC: .WORD 0020,0040,0100,0200	; GRN FIELD <7:4>.
	011214	000200				
1875	011216	000400	001000	002000	BSPEC: .WORD 0400,1000,2000,4000	; BLU FIELD <11:8>.
	011224	004000				
1876	011226	000000	000421	001042	CSPEC: .WORD 0000,0421,1042,2104	; CMP FIELD <11:0>.
	011234	002104				

1877						
1878	011236	000002	000004	000010	. GAMMA OFF CROSS-OVER SPECS. RSPEC1: .WORD 0002,0004,0010,0013	
	011244	000013				
1879	011246	000040	000100	000200	GSPEC1: .WORD 0040,0100,0200,0260	
	011254	000260				
1880	011256	001000	002000	004000	BSPEC1: .WORD 1000,2000,4000,5400	
	011264	005400				
1881	011266	000000	000421	002104	CSPEC1: .WORD 0000,0421,2104,4631	
	011274	004631				
1882	011276				ENDTST	

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 35
TEST 4 BAR-DOT GENERATOR (STAND-ALONE)

1884				
1885				
1886				
1887	011300			
1888				
1889				
1890	011344	005737	002656	
1891	011350	001403		
1892	011352	005737	005472	
1893	011356	001402		
1894	011360			
1895				
1896				
1897				
1898				
1899				
1900				
1901				
1902				
1903				
1904				
1905				
1906				
1907				
1908				
1909				
1910				
1911				
1912				
1913				
1914				
1915				
1916				
1917				
1918				
1919				
1920	011364	004737	005422	
1921	011370			
1922	011410			
1923	011430	004737	012022	
1924	011434	012737	012306	012270
1925	011442	012737	014032	002734
1926	011450	012737	002000	002732
1927	011456	000502		
1928				
1929	011460	045	116	045
	011463	101	040	101
	011466	040	075	040
	011471	101	114	124
	011474	105	122	116
	011477	101	124	105
1930	011502	045	116	045
	011505	101	040	102
	011510	040	075	040
	011513	102	101	122
	011516	123		
1931	011517	045	116	045

```

.SBTTL TEST 4 BAR-DOT GENERATOR (STAND-ALONE)
;*****
;BEGIN.TEST <BAR-DOT GENERATOR>
;*****
;
; TST DPC
; BEQ 1$ ; EXIT IF NO DPU...
; TST TESTK ; ...OR NOT SELECTED ALONE.
; BEQ BDGEN ; BR IF OK TO RUN.
; EXIT TST ; OTHERWISE, EXIT.
1$:
;
; TEST 4 IS A SPECIAL BAR-DOT-CROSSHATCH GENERATOR
; TO BE USED FOR COLOR MONITOR CONVERGENCE SET UP.
;
; IT WILL RUN ONLY IF SPECIFIED AS:
; STA/RES:4 OR RES/RES:4
; ONCE STARTED, THERE IS NO EXIT, SAVE <^C>.
;
; ROUTINE DEFAULTS TO 8 BAR NTSC RAINBOW
; OR GRAY-SCALE SHADES DEPENDANT ON PIXEL SIZE AS FOLLOWS:
; 2 BITS <9:8> = 4 COLORS/SHADES.
; 4 BITS <9:6> = 16 COLORS/SHADES.
; 6 BITS <9:4> = 64 COLORS/SHADES.
; 8 BITS <9:2> = 256 COLORS/SHADES.
;
; CHANGE MODES VIA KEYBOARD:
; A = ALTERNATE (8 COL / 16 COL / 64 COL / 256 GRAY-SCALE)
; (OR R,G,B,W, IF 'C' OR 'D' SELECTED)
; B = BAR GENERATOR.
; C = 7 X 7 CROSS-HATCH.
; D = 7 X 7 DOT ARRAY.
; E = ENABLE GAMMA CORRECTION
; G = GAMMA CORRECTION: OFF
; TYPE 2 <^C>'S TO RETURN TO SUPVSR COMMAND MODE.
;
BDGEN: JSR PC,TSTGO ; TITLE.
; PRINTF #1$ ; GIVE HIM SOME GUIDANCE...
; PRINTF #2$ ; AND A BIT MORE GUIDANCE..
; JSR PC,BARS ; ...AND DRAW THE COLOR BARS.
; MOV #ALTM+20,ALTM+2 ; INIT CHANGE DISPATCHER.
; MOV #NTSC8+2,HJE ; SET HUE AND DELAY COUNT...
; MOV #2000,SHADLY ; ...FOR SHADING SUBROUTINE.
; BR IDLE ; WAIT FOR SOMETHING TO HAPPEN.
1$: .ASCII /%N% A = ALTERNATE/
;
; .ASCII /%N% B = BARS/
;
; .ASCII /%N% C = CROSS-HATCH/

```

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 35-1
TEST 4 BAR-DOT GENERATOR (STAND-ALONE)

	011522	101	040	103	
	011525	040	075	040	
	011530	103	122	117	
	011533	123	123	055	
	011536	110	101	124	
	011541	103	110		
1932	011543	045	116	045	.ASCIZ /%N% A D = DOTS/
	011546	101	040	104	
	011551	040	075	040	
	011554	104	117	124	
1933	011557	123	000		
	011561	045	116	045	2\$: .ASCII /%N% A E = ENABLE GAMMA CORRECTION/
	011564	101	040	105	
	011567	040	075	040	
	011572	105	116	101	
	011575	102	114	105	
	011600	040	107	101	
	011603	115	115	101	
	011606	040	103	117	
	011611	122	122	105	
	011614	103	124	111	
	011617	117	116		
1934	011621	045	116	045	.ASCIZ /%N% A G = GAMMA CORRECTION OFF%N2/
	011624	101	040	107	
	011627	040	075	040	
	011632	107	101	115	
	011635	115	101	040	
	011640	103	117	122	
	011643	122	105	103	
	011646	124	111	117	
	011651	116	040	117	
	011654	106	106	045	
1935	011657	116	062	000	.EVEN

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 36
 TEST 4 BAR-DOT GENERATOR (STAND-ALONE)

```

1937
1938
1939
1940 011662 000000
1941
1942 011664
1943 011704 013700 011662
1944
1945
1946
1947 011710 120027 000003
1948 011714 001002
1949 011716
1950 011720 000776
1951
1952 011722 120027 000101
1953 011726 001002
1954 011730 004737 012170
1955 011734 120027 000102
1956 011740 001002
1957 011742 004737 012022
1958 011746 120027 000103
1959 011752 001002
1960 011754 004737 012602
1961 011760 120027 000104
1962 011764 001002
1963 011766 004737 012452
1964 011772 120027 000105
1965 011776 001002
1966 012000 004737 012774
1967 012004 120027 000107
1968 012010 001002
1969 012012 004737 013002
1970 012016 000722
1971
1972
1973 012020 015
1974 012021 000
1975

```

```

: IDLE LOOP. WAIT FOR KBD ENTRY TO CHANGE MODES.
: INPUT: .WORD 0
IDLE: GMANID CHOICE,INPUT,A,377,1,1,NO
MOV INPUT,RO ; GET KB DATA IN RO
:
:
1$: CMPB RO,#3
BNE 2$
BREAK 1$ ; TAKES 2 ^C'S TO EXIT.
BR 1$
2$: CMPB RO,#'A ; <A>, XCT ALTERNATE DATA PATTERNS
BNE .+6
JSR PC,ALT
CMPB RO,#'B
BNE .+6
JSR PC,BARS ; <B>, XCT BARS.
CMPB RO,#'C
BNE .+6
JSR PC,HATCH ; <C>, XCT CROSS-HATCH.
CMPB RO,#'D
BNE .+6
JSR PC,DOTS ; <D>, XCT DOTS.
CMPB RO,#'E
BNE .+6
JSR PC,GAON ; <E>, XCT GAMMA ON
CMPB RO,#'G
BNE 3$
JSR PC,GAOFF ; <G> XCI GAMMA OFF
BR 3$
: CHOICE: .BYTE 15 ; DO CARRIAGE RETURN
: .BYTE 0
: .EVEN

```

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 37
 TEST 4 BAR-DOT GENERATOR (STAND-ALONE)

```

1977
1978
1979
1980
1981 012022 005037 012772
1982 012026 004737 004712
1983 012032 012737 012306 012270
1984 012040 004737 005030
1985 012044 012737 112000 012140
1986 012052 012701 000004
1987 012056 012702 000400
1988 012062 012777 012132 170566
1989 012070 000402
1990 012072 005277 170560
1991 012076 004737 005214
1992 012102 005302
1993 012104 001411
1994 012106 060137 012140
1995 012112 042737 176000 012140
1996 012120 052737 112000 012140
1997 012126 000761
1998 012130 000207
1999
2000 012132 114000 000000 000000
2001 012140 112000
2002 012142 040000 001776
2003 012146 000002 000000
2004 012152 040000 021776
2005 012156 000002 000000
2006 012162 173000
2007 012164 160000 012140
2008
2009
2010
2011 012170 005737 012772
2012 012174 001434
2013 012176 000137
2014 012200 012202
2015 012202 012701 014376
2016 012206 012737 012216 012200
2017 012214 000421
2018 012216 012701 014316
2019 012222 012737 012232 012200
2020 012230 000413
2021 012232 012701 014336
2022 012236 012737 012246 012200
2023 012244 000405
2024 012246 012701 014356
2025 012252 012737 012202 012200
2026 012260 004737 005034
2027 012264 000207
2028 012266 000137
2029 012270 012306
2030 012272 004737 005030
2031 012276 012737 012306 012270
2032 012304 000207
2033 012306 004737 005042

: COLOR BAR GENERATOR.
: NUMBER AND COLOR OF BARS DEPENDANT ON PIXEL SIZE.
:
BARS: CLR CD ; CLEAR CROSS/DOTS FLAG
      JSR PC,CLRRW ; INIT DISPLAY.
      MOV #ALTM+20,ALTM+2 ; GET SEQUENCE RIGHT
      JSR PC,NTSC ; NTSC COLORS
      MOV #LVEC!LO,BV ; INIT DISPLAY CODE AT LVL 0...
      MOV #4,R1 ; ...AND INCREMENT BY LVL 1.
1$: MOV #256.,R2 ; 256 PAIRS = 512 TOTAL.
     MOV #BGEN,@DPC
2$: INC @DPC
     JSR PC,WAITF
     DEC R2
     BEQ 3$ ; BR WHEN FINISHED.
     ADD R1,BV ; OTHERWISE, INCREMENT...
     BIC #^C1777,BV ; ...AND STRIP THE LEVEL...
     BIS #LVEC!LO,BV ; ...AND REPLACE OPCODE.
     BR 2$ ; ...AND LOOP.
3$: RTS PC ; RETURN TO IDLE LOOP.

BGEN: APNT, 0, 0
BV: LVEC!LO
     I!0, MAXY ; UP...
     2, 0 ; ...AND OVER...
     I!0, MXY!MAXY ; ...DOWN...
     2, 0 ; ...AND OVER AGAIN.
     STOPN
     DJMP, BV

: ON <ALT>, CHANGE THE COLOR PATTERNS IN THE LUT.
:
ALT: TST CD ; CROSS-HATCH OR DOTS ?
     BEQ ALTM ; IF NOT JUMP
ALT1: JMP @PC)+ ; ELSE, GET NEXT COLOR
1$: MOV #WT,R1 ; MAKE IT WHITE
     MOV #2$,ALT1+2 ; GREEN NEXT TIME ROUND
     BR 5$
2$: MOV #RD,R1 ; MAKE IT RED
     MOV #3$,ALT1+2 ; BLUE NEXT
     BR 5$
3$: MOV #GN,R1 ; MAKE IT GREEN
     MOV #4$,ALT1+2 ; WHITE NEXT
     BR 5$
4$: MOV #BL,P1 ; MAKE IT BLUE
     MOV #1$,ALT1+2 ; BACK TO WHITE NEXT
5$: JSR PC,NTSC+4 ; GO SET UP THE LUT
     RTS PC ; GO BACK TO IDLE
     JMP @PC)+ ; DISPATCH.
1$: JSR PC,NTSC ; 8 STANDARD COLORS.
     MOV #2$,ALTM+2 ; CHANGE DISPATCH.
     RTS PC
2$: JSR PC,CL16 ; 16 COLORS.

```

CZVSVAD COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 37-1
 TEST 4 BAR-DOT GENERATOR (STAND-ALONE)

2034	012312	012737	012322	012270		MOV	#3\$,ALTM+2		
2035	012320	000207				RTS	PC		
2036	012322	004737	005054		3\$:	JSR	PC,CL64	:	64 COLORS
2037	012326	012737	012336	012270		MOV	#4\$,ALTM+2	:	
2038	012334	000207				RTS	PC	:	
2039	012336	004737	005016		4\$:	JSR	PC,LUMIN	:	256 LEVEL GRAY-SCALE.
2040	012342	012737	012352	012270		MOV	#5\$,ALTM+2		
2041	012350	000207				RTS	PC		
2042	012352	013700	002734		5\$:	MOV	HUE,R0	:	GET POINTER.
2043	012356	012001				MOV	(R0)+,R1	:	GET 1ST/NEXT COLOR.
2044	012360	100405				BMI	6\$:	RESET IF END-OF-LIST.
2045	012362	010037	002734			MOV	R0,HUE	:	OTHERWISE, SAVE POINTER...
2046	012366	004737	005132			JSR	PC,SHAD16	:	...DO 16 SHADES THIS COLOR.
2047	012372	000207				RTS	PC		
2048	012374	012737	014032	002734	6\$:	MOV	#NTSC8+2,HUE	:	RESET HUE POINTER.
2049	012402	012737	012272	012270		MOV	#1\$,ALTM+2	:	RESET DISPATCHER.
2050	012410	000726				BR	ALTM	:	AND GO 'ROUND.

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 38
 TEST 4 BAR-DOT GENERATOR (STAND-ALONE)

```

2052
2053      ; 7 X 7 POINT TABLE FOR DOTS AND CROSS-HATCH.
2054
2055      XTBL:
2056      Y50TBL: 34.*2      ; X POINTS...
2057      108.*2          ; ...AND 50 HZ Y POINTS.
2058      182.*2          ; DELTA = 74.
2059      256.*2
2060      330.*2
2061      404.*2
2062      478.*2
2063      -1
2064      Y60TBL: 36.*2      ; 60 HZ Y POINTS.
2065      104.*2          ; DELTA = 68.
2066      172.*2
2067      240.*2
2068      308.*2
2069      376.*2
2070      444.*2
2071      -1
2072
2073      ; DOT GENERATOR.
2074
2075      DOTS:  INC      CD      ; SET CD FLAG
2076      JSR      PC,CLRRW    ; INIT DISPLAY.
2077      MOV      #ALT1+4,ALT1+2 ; FIRST COLOR ALWAYS WHITE
2078      JSR      PC,ALT      ; SET UP COLOR
2079      MOV      #Y60TBL,R2   ; ASSUME 60 HZ Y'S.
2080      CMP      HZ,#60.
2081      BEQ      1$
2082      MOV      #Y50TBL,R2   ; WRONG, USE 50 HZ Y'S.
2083
2084      1$:      MOV      (R2)+,DGY ; SET Y POINT.
2085      BMI      3$          ; BR WHEN ALL DOTS DONE.
2086      MOV      #XTBL,R1
2087      2$:      MOV      (R1)+,DGX ; SET X POINT.
2088      BMI      1$          ; X DONE, GET NEXT Y.
2089      BIS      #I,DGX       ; SET I BIT.
2090      MOV      #DGEN,@DPC
2091      JSR      PC,WAITF
2092      BR       2$
2093      3$:      RTS      PC      ; LOOP
2094      ; RETURN.
2095      DGEN:    APNT!ALL
2096      DGX:     I!0
2097      DGY:     0
2098      STOPN
2099      RPNT
2100      SXY     1,2,0
2101      SXY     1,0,2
2102      SXY     1,-2,0
2103      STOPN
    
```

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 39
 TEST 4 BAR-DOT GENERATOR (STAND-ALONE)

```

2105
2106      : CROSS-HATCH GENERATOR.
2107      :
2108 012602 005237 012772      HATCH: INC      CD      : SET CD FLAG
2109 012606 004737 004712      JSR      PC,CLRRW  : INIT DISPLAY.
2110 012612 012737 012202 012200  MOV      #ALT1+4,ALT1+2 : FIRST COLOR ALWAYS WHITE
2111 012620 004737 012170      JSR      PC,ALT    : SET UP COLOR
2112 012624 005037 012756      CLR      CHX
2113 012630 012737 041776 012764  MOV      #I!MAXX,CHV  : SET FOR HORIZ VECTORS.
2114 012636 005037 012766      CLR      CHV+2
2115 012642 012701 012432      MOV      #Y60TBL,R1  : ASSUME 60 HZ Y'S.
2116 012646 023727 005650 000074  CMP      HZ,#60.
2117 012654 001402      BEQ      1$
2118 012656 012701 012412      MOV      #Y50TBL,R1  : WRONG AGAIN.
2119
2120 012662 012137 012760      1$:  MOV      (R1)+,CHY  : SET NEXT Y.
2121 012666 100406      BMI      2$        : BR AT END OF Y'S.
2122 012670 012777 012754 167760  MOV      #HGEN,@DPC
2123 012676 004737 005214      JSR      PC,WAITF
2124 012702 000767      BR      1$        : LOOP FOR 7 HORIZ VECTORS.
2125
2126 012704 005037 012760      2$:  CLR      CHY
2127 012710 012737 040000 012764  MOV      #I!0,CHV    : SET FOR VERT VECTORS.
2128 012716 012737 001776 012766  MOV      #MAXY,CHV+2
2129 012724 012701 012412      MOV      #XTBL,R1
2130 012730 012137 012756      3$:  MOV      (R1)+,CHX  : SET NEXT X.
2131 012734 100406      BMI      4$        : BR AT END OF X'S.
2132 012736 012777 012754 167712  MOV      #HGEN,@DPC
2133 012744 004737 005214      JSR      PC,WAITF
2134 012750 000767      BR      3$
2135 012752 000207      4$:  RTS      PC      : LOOP FOR 7 VERT VECTORS.
2136      : RETURN.
2137 012754 114000      HGEN:  APNT
2138 012756 000000      CHX:   0
2139 012760 000000      CHY:   0
2140 012762 112377      CHV:   LVEC!ALL
2141 012764 041776 000000      CHV:   I!MAXX,0
2142 012770 173000      CHV:   STOPN
2143
2144 012772 000000      CD:    0      : SET FOR CROSS-HATCH OR DOTS
2145
2146 012774 005077 167672      GAON:  CLR      @LMR  : SET GAMMA ON
2147 013000 000207      RTS      PC
2148
2149
2150 013002 052777 000100 167662  GAOFF:  BIS      #GCOFF,@LMR  : SET GAMMA OFF
2151 013010 000207      RTS      PC
2152
2153
2154
2155 013012      ENDTST

```

2157
2158
2159
2160
2161
2162
2163
2164
2165 013014

.SBTTL
.SBTTL SUPERVISORS DISPATCH TABLE

:++
: THIS TABLE HOLDS THE STARTING ADDRESS OF EACH TEST
: FOR THE SUPERVISOR'S DISPATCHER.
:--

DISPATCH T\$TESTNUM

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 41
 *** LUMINANCE (GREY-SCALE) AND COLOR DATA TABLES

```

2167          .SBTTL *** LUMINANCE (GREY-SCALE) AND COLOR DATA TABLES
2168          :
2169          : TABLE OF 256 (8 BITS) LUMINANCE VALUES TO PRODUCE
2170          : A LINEAR 12 BIT GREY-SCALE.
2171          :
2172          : LUMTBL:
2173          : 0,      400,    1000,    1
2174          : 1400,   401,    2000,   1001
2175          : 2400,   20,     420,    1020
2176          : 21,     1420,   421,    2020
2177          : 1021,   2420,   40,     440
2178          : 1040,   41,     1440,   441
2179          : 2040,   1041,   2440,   42
2180          : 1441,   460,    1060,   61
2181          : 1460,   461,    2060,   1061
2182          : 2460,   62,     1461,   462
2183          : 1062,   63,     1462,   463
2184          : 2062,   1063,   2462,   1501
2185          : 502,    2101,   1102,   2502
2186          : 1502,   3101,   503,    2102
2187          : 1121,   122,    1521,   522
2188          : 1122,   123,    1522,   523
2189          : 2122,   1123,   2522,   142
2190          : 1541,   542,    1142,   143
2191          : 1542,   543,    2142,   1143
2192          : 2542,   1543,   562,    2161
2193          : 1162,   2561,   1562,   563
2194          : 2162,   1163,   2562,   1163
2195          : 564,    2201,   1202,   2601
2196          : 1602,   3201,   603,    2202
2197          : 1203,   2602,   1603,   3202
2198          : 2221,   1222,   2621,   1622

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CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 41-1
 *** LUMINANCE (GREY-SCALE) AND COLOR DATA TABLES

2199	013344	001622						
	013346	003221	000623	002222	3221,	623,	2222,	1223
	013354	001223						
2200	013356	002622	001623	000624	2622,	1623,	624,	2241
	013364	002241						
2201	013366	001242	002641	001642	1242,	2641,	1642,	3241
	013374	003241						
2202	013376	000643	002242	001243	643,	2242,	1243,	2642
	013404	002642						
2203	013406	001643	003242	002261	1643,	3242,	2261,	1262
	013414	001262						
2204	013416	002661	001662	003261	2661,	1662,	3261,	663
	013424	000663						
2205	013426	002262	001263	002662	2262,	1263,	2662,	1663
	013434	001663						
2206	013436	003262	002301	001302	3262,	2301,	1302,	2702
	013444	002702						
2207	013446	001702	003301	000703	1702,	3301,	703,	2302
	013454	002302						
2208	013456	001303	002702	001703	1303,	2702,	1703,	3302
	013464	003302						
2209	013466	002321	001322	002721	2321,	1322,	2721,	1722
	013474	001722						
2210	013476	003321	000723	002322	3321,	723,	2322,	1323
	013504	001323						
2211	013506	002722	001723	003322	2722,	1723,	3322,	2341
	013514	002341						
2212	013516	001342	002741	001742	1342,	2741,	1742,	3341
	013524	003341						
2213	013526	000743	002342	001343	743,	2342,	1343,	2742
	013534	002742						
2214	013536	001743	003342	002361	1743,	3342,	2361,	1362
	013544	001362						
2215	013546	002761	001762	003361	2761,	1762,	3361,	763
	013554	000763						
2216	013556	002362	001363	002762	2362,	1363,	2762,	1763
	013564	001763						
2217	013566	003362	002363	001364	3362,	2363,	1364,	2763
	013574	002763						
2218	013576	001764	003363	002364	1764,	3363,	2364,	1365
	013604	001365						
2219	013606	002764	001765	003364	2764,	1765,	3364,	2365
	013614	002365						
2220	013616	001366	002765	001766	1366,	2765,	1766,	3365
	013624	003365						
2221	013626	002366	001367	002766	2366,	1367,	2766,	1767
	013634	001767						
2222	013636	003366	002367	003766	3366,	2367,	3766,	2767
	013644	002767						
2223	013646	004366	003367	002370	4366,	3367,	2370,	3767
	013654	003767						
2224	013656	002770	004367	005766	2770,	4367,	5766,	4767
	013664	004767						
2225	013666	003770	005367	004370	3770,	5367,	4370,	5767
	013674	005767						
2226	013676	004770	003771	005370	4770,	3771,	5370,	4371
	013704	004371						

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 *** LUMINANCE (GREY-SCALE) AND COLOR DATA TABLES

2227	013706	005770	004771	003772	5770.	4771.	3772.	2773
	013714	002773						
2228	013716	004372	003373	004772	4372.	3373.	4772.	3773
	013724	003773						
2229	013726	005372	004373	005772	5372.	4373.	5772.	4773
	013734	004773						
2230	013736	006372	005373	006772	6372.	5373.	6772.	5773
	013744	005773						
2231	013746	004774	006373	005374	4774.	6373.	5374.	6773
	013754	006773						
2232	013756	005774	007373	006374	5774.	7373.	6374.	5375
	013764	005375						
2233	013766	006774	005775	007374	6774.	5775.	7374.	6375
	013774	006375						
2234	013776	005376	006775	005776	5376.	6775.	5776.	7375
	014004	007375						
2235	014006	006376	007375	006376	6376.	7375.	6376.	6776
	014014	006776						
2236	014016	007376	006777	007377	7376.	6777.	7377.	7777
	014024	007777						
2237	014026	177777						

-1

: TERMINATE LIST

2238								
2239								
2240								
2241		002400						
2242		000005						
2243		000120						
2244		005000						
2245		000012						
2246		000240						
2247		007400						
2248		000017						
2249		000360						

LBLU= 2400
 LRED= 5
 LGRN= 120
 MBLU= 5000
 MRED= 12
 MGRN= 240
 BLU= 7400
 RED= 17
 GRN= 360

: THE BASIC (NTSC) COLORS, PLUS BLACK AND WHITE.

2250								
2251								
2252								
2253								
2254	014030	000000						
2255	014032	007400						
2256	014034	000017						
2257	014036	007417						
2258	014040	000360						
2259	014042	007760						
2260	014044	000377						
2261	014046	007777						
2262	014050	177777						

NTSC8: 0 ; BLACK (NO COLOR AT ALL).

BLU
 RED
 RED+BLU ; MAGENTA
 GRN
 GRN+BLU ; CYAN
 GRN+RED ; YELLOW
 GRN+RED+BLU ; WHITE
 -1 ; TERMINATE LIST.

2263								
2264								
2265								
2266	014052	000000						
2267	014054	000005						
2268	014056	000017						
2269	014060	000137						
2270	014062	000257						
2271	014064	000377						
2272	014066	000372						
2273	014070	000360						

: A 16 COLOUR RAINBOW

COL16: 0
 LRED
 RED
 RED+LGRN
 RED+MGRN
 RED+GRN
 MRED+GRN
 GRN

CZVSVAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 41-3
 *** LUMINANCE (GREY-SCALE) AND COLOR DATA TABLES

2274	014072	002640	MGRN+LBLU
2275	014074	005365	MBLU+LRED+GRN
2276	014076	007640	MGRN+BLU
2277	014100	007400	BLU
2278	014102	007412	BLU+MRED
2279	014104	007417	BLU+RED
2280	014106	007657	BLU+RED+MGRN
2281	014110	007777	BLU+RED+GRN
2282	014112	177777	-1
2283			
2284			
2285			
2286			
2287			
2288	014114	000000	
2289	014116	000005	LRED
2290	014120	002412	MRED+LBLU
2291	014122	000012	MRED
2292	014124	000017	RED
2293	014126	002532	MRED+LGRN+LBLU
2294	014130	002537	RED+LGRN+LBLU
2295	014132	000132	MRED+LGRN
2296	014134	000137	RED+LGRN
2297	014136	002417	RED+LBLU
2298	014140	005012	MRED+MBLU
2299	014142	005132	MRED+LGRN+MBLU
2300	014144	005017	RED+MBLU
2301	014146	005137	RED+LGRN+MBLU
2302	014150	007417	RED+BLU
2303	014152	007537	RED+LGRN+BLU
2304	014154	002657	RED+MGRN+LBLU
2305	014156	005257	RED+MGRN+MBLU
2306	014160	007657	RED+MGRN+BLU
2307	014162	002400	LBLU
2308	014164	002405	LRED+LBLU
2309	014166	002520	LGRN+LBLU
2310	014170	005000	MBLU
2311	014172	005120	LGRN+MBLU
2312	014174	005005	LRED+MBLU
2313	014176	005125	LRED+LGRN+MBLU
2314	014200	005240	MGRN+MBLU
2315	014202	005245	LRED+MGRN+MBLU
2316	014204	007525	LRED+LGRN+BLU
2317	014206	007532	MRED+LGRN+BLU
2318	014210	007412	MRED+BLU
2319	014212	007645	LRED+MGRN+BLU
2320	014214	007652	MRED+MGRN+BLU
2321	014216	007405	LRED+BLU
2322	014220	007400	BLU
2323	014222	007520	LGRN+BLU
2324	014224	007640	MGRN+BLU
2325	014226	007760	GRN+BLU
2326	014230	007765	LRED+GRN+BLU
2327	014232	007772	MRED+GRN+BLU
2328	014234	000120	LGRN
2329	014236	000125	LRED+LGRN
2330	014240	002640	MGRN+LBLU

: TERMINATE LIST

.....
 64 COLOURS TO FEAST YOUR EYES ON
 COL64: 0

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*** LUMINANCE (GREY-SCALE) AND COLOR DATA TABLES

2331	014242	002645	LRED+MGRN+LBLU
2332	014244	002652	MRED+MGRN+LBLU
2333	014246	000252	MRED+MGRN
2334	014250	000257	RED+MGRN
2335	014252	000245	LRED+MGRN
2336	014254	000240	MGRN
2337	014256	000360	GRN
2338	014260	000365	LRED+GRN
2339	014262	002760	GRN+LBLU
2340	014264	002765	LRED+GRN+LBLU
2341	014266	002772	MRED+GRN+LBLU
2342	014270	000372	MRED+GRN
2343	014272	005372	MRED+GRN+MBLU
2344	014274	005360	GRN+MBLU
2345	014276	005365	LRED+GRN+MBLU
2346	014300	000377	RED+GRN
2347	014302	002777	RED+GRN+LBLU
2348	014304	005377	RED+GRN+MBLU
2349	014306	002525	LRED+LGRN+LBLU
2350	014310	005252	MRED+MGRN+MBLU
2351	014312	007777	RED+GRN+BLU
2352	014314	177777	-1

; TERMINATE LIST

2353			
2354			
2355	014316	000000	RD: 0
2356	014320	000017	RED
2357	014322	000017	RED
2358	014324	000017	RED
2359	014326	000017	RED
2360	014330	000017	RED
2361	014332	000017	RED
2362	014334	000017	RED
2363			
2364			
2365	014336	000000	GN: 0
2366	014340	000360	GRN
2367	014342	000360	GRN
2368	014344	000360	GRN
2369	014346	000360	GRN
2370	014350	000360	GRN
2371	014352	000360	GRN
2372	014354	000360	GRN
2373			
2374			
2375	014356	000000	BL: 0
2376	014360	007400	BLU
2377	014362	007400	BLU
2378	014364	007400	BLU
2379	014366	007400	BLU
2380	014370	007400	BLU
2381	014372	007400	BLU
2382	014374	007400	BLU
2383			
2384			

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 *** LUMINANCE (GREY-SCALE) AND COLOR DATA TABLES

2386	014376	000000	WT:	0	
2387	014400	007777		7777	
2388	014402	007777		7777	
2389	014404	007777		7777	
2390	014406	007777		7777	
2391	014410	007777		7777	
2392	014412	007777		7777	
2393	014414	007777		7777	
2394	014416	177777		-1	; TERMINATE LIST
2395			.SBTTL	*** PATCH AREA	
2396			.SBTTL		
2397			:		
2398			:	FINALLY A GENEROUS PATCH AREA.	
2399			:		
2400			:	AND AN ADJUSTMENT TO ACCOUNT FOR THE 'LASTAD BIT7' HACK	
2401			:	DESCRIBED IN 'SUPPRG.MEM' (FOR REV C).	
2402			:		
2403			:		
2404			:		
2405	014420		PATCH:	.BLKB <<.+400>8^C377>-.	
2406					
2407		015000		=	
2408	015000		L\$LAST::	LASTAD	;SET LAST USED ADDRESS.
2409	015004				
2410			.SBTTL	***** TH - TH - TH - TH - THAT'S ALL FOLKS ! *****	
2411		000001		.END	

CZVSAO COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 42-1
 SYMBOL TABLE

ADR = 000020 G	CHX 012756	C\$INIT= 000011	ENVIRN 005554	GRNSUM 010562
ALL = 002377 G	CHY 012760	C\$INLP= 000020	ERRBLK 003230 G	GRN1 010020
ALT 012170	CHO = 000000 G	C\$MANI= 000050	ERRK 005532	GSPEC 011206
ALTM 012266	CH1 = 000400 G	C\$MEM = 000031	ERRMSG 003226 G	GSPEC1 011246
ALT1 012176	CH2 = 001000 G	C\$MESSG = 000023	ERRNBR 003224 G	GXI = 174100 G
APNT = 114000 G	CH3 = 001400 G	C\$OPEN= 000034	ERRTYP 003222 G	GYI = 174100 G
ASSEMB= 000010	CLRMEM= 170140 G	C\$PNTB= 000014	ESUM 005534	G\$CNTO= 000200
BARS 012022	CLRRW 004712	C\$PNTF= 000017	EVL = 000004 G	G\$DELM= 000372
BDAC 011156	CLRW 004702	C\$PNTS= 000016	EXP 011047	G\$DISP= 000003
BDERR 004271	CL16 005042	C\$PNTX= 000015	EXSM2 = 000050 G	G\$EXCP= 000400
BDGEN 011364	CL64 005054	C\$QIO = 000377	EXSM4 = 000060 G	G\$HILI= 000002
BGEN 012132	CMPSUM 010606	C\$RDBU= 000007	EXTA 003234	G\$LOLI= 000001
BIT0 = 000001 G	CMP1 010134	C\$REFG= 000047	EXTEND 003232	G\$NO = 000000
BIT00 = 000001 G	CNTNU 006272	C\$RESE= 000033	EX2 = 000010 G	G\$OFFS= 000400
BIT01 = 000002 G	COL16 014052	C\$REVI= 000003	EX4 = 000020 G	G\$OF SI= 000376
BIT02 = 000004 G	COL64 014114	C\$RFLA= 000021	ESEND = 002100	G\$PRMA= 000001
BIT03 = 000010 G	CSPEC 011226	C\$RPT = 000025	ESLOAD= 000035	G\$PRMD= 000002
BIT04 = 000020 G	CSPEC1 011266	C\$SEFG= 000046	FLAGS 002726	G\$PRML= 000000
BIT05 = 000040 G	CUIM = 146016 G	C\$SPRI= 000041	FREE 005644	G\$RADA= 000140
BIT06 = 000100 G	CUIOFF= 146012 G	C\$SVEC= 000037	FRESIZ 005646	G\$RADB= 000000
BIT07 = 000200 G	CUIS = 146013 G	C\$TPRI= 000013	FSAU = 000015	G\$RADD= 000040
BIT08 = 000400 G	CUOFF = 146040 G	DACERR 003120 G	FSAUTO= 000020	G\$RADL= 000120
BIT09 = 001000 G	CUON = 146060 G	DACGC 004500	F\$BGN = 000040	G\$RADO= 000020
BIT1 = 000002 G	CURD = 146100 G	DACX 004552	F\$CLEA= 000007	G\$XFER= 000004
BIT10 = 002000 G	CVC = 000040 G	DACX1 004340	F\$DU = 000016	G\$YES = 000010
BIT11 = 004000 G	C\$AU = 000052	DACX2 004421	F\$END = 000041	HAFX = 000776 G
BIT12 = 010000 G	C\$AUTO= 000061	DATA 011111	F\$HARD= 000004	HAFY = 000776 G
BIT13 = 020000 G	C\$BRK = 000022	DEADU 006330	F\$HW = 000013	HAFY50= 000776 G
BIT14 = 040000 G	C\$BSEG= 000004	DFPTBL 002222 G	F\$INIT= 000006	HAFY60= 000736 G
BIT15 = 100000 G	C\$BSUB= 000002	DGEN 012560	F\$JMP = 000050	HATCH 012602
BIT2 = 000004 G	C\$CEFG= 000045	DGX 012562	F\$MOD = 000000	HCOPY = 176051 G
BIT3 = 000010 G	C\$CLCK= 000062	DGY 012564	F\$MSG = 000011	HCPY = 000001 G
BIT4 = 000020 G	C\$CLEA= 000012	DIAGMC= 000000	F\$PROT= 000021	HGEN 012754
BIT5 = 000040 G	C\$CLOS= 000035	DJM 004610	F\$PWR = 000017	HOE = 100000 G
BIT6 = 000100 G	C\$CLP1= 000006	DJMP = 160000 G	F\$RPT = 000012	HST = 040000 G
BIT7 = 000200 G	C\$CVEC= 000036	DJS 004614	F\$SEG = 000003	HUE 002734 G
BIT8 = 000400 G	C\$DCLN= 000044	DNOP = 164000 G	F\$SOFT= 000005	HZ 005650
BIT9 = 001000 G	C\$DODU= 000051	DOTS 012452	F\$SRV = 000010	I = 040000 G
BL 014356	C\$DRPT= 000024	DO4 010676	F\$SUB = 000002	IBE = 010000 G
BLU = 007400	C\$DU = 000053	DPC 002656 G	F\$SW = 000014	IDLE 011664
BLUC = 000004 G	C\$EDIT= 000003	DPOP = 165000 G	F\$TEST= 000001	IDPC 002710 G
BLUSUM 010574	C\$ERDF= 000055	DPRI 002674 G	GAMMA 010512	IDSR 002712 G
BLU1 010066	C\$ERHR= 000056	DPUSAV 004620	GAOFF 013002	IDU = 000040 G
BM04 = 134000 G	C\$ERRO= 000060	DSR 002660 G	GAON 012774	IDXR 002714 G
BM08 = 135000 G	C\$ERSF= 000054	DSTP 004604	GCBIT 010544	IDYR 002716 G
BM14 = 136000 G	C\$ERSO= 000057	DTO 004556	GCOFF = 000100 G	IER = 020000 G
BM18 = 137000 G	C\$ESCA= 000010	DX = 000002 G	GCX 004554	ILDR 002722 G
BOE = 000400 G	C\$ESEG= 000005	DXR = 002662 G	GDAC 011146	ILMR 002724 G
BSPEC 011216	C\$ESUB= 000003	DYJ = 000002 G	GDERR 004247	ILSR 002720 G
BSPEC1 011256	C\$ETST= 000001	DYNI = 000004 G	GHX = 120000 G	INPUT 011662
BV 012140	C\$EXIT= 000032	DYR 002664 G	GHY = 124000 G	ISR = 000100 G
CD 012772	C\$GETB= 000026	EF.CON= 000036 G	GN 014336	IXE = 004000 G
CDAC 011166	C\$GETW= 000027	EF.NEW= 000035 G	GOFF 004545	ISAU = 000041
CDERR 004312	C\$GMAN= 000043	EF.PWR= 000034 G	GON 004540	ISAUTO= 000041
CHAR = 100000 G	C\$GPHR= 000042	EF.RES= 000037 G	GONOGO 010352	ISCLN = 000041
CHOICE 012020	C\$GPLO= 000030	EF.STA= 000040 G	GRN = 000360	ISDU = 000041
CHV 012764	C\$GPRI= 000040	EN = 000620	GRNC = 000010 G	ISHRD = 000041

CZVSVAO COLOUR LOOKUP OPTION
SYMBOL TABLE

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I\$INIT= 000041	L\$AUT 002070 G	L10005 003026	O\$AU = 000001	STOPN = 173000 G
I\$MOD = 000041	L\$AUTO 006324 G	L10006 003060	O\$BGNR= 000000	STPV = 002676 G
I\$MSG = 000040	L\$CCP 002106 G	L10007 003116	O\$BGNS= 000001	SVCGBL= 000000
I\$PROT= 000040	L\$CLEA 006504 G	L10010 003170	O\$DU = 000001	SVCINS= 177777
I\$PTAB= 000041	L\$CO 002032 G	L10012 006314	O\$ERRT= 000001	SVCSUB= 177777
I\$PWR = 000041	L\$DEPO 002011 G	L10014 006324	O\$GNSW= 000001	SVCTAG= 177777
I\$RPT = 000041	L\$DESC 002122 G	L10015 006420	O\$POIN= 000001	SVCTST= 177777
I\$SEG = 000041	L\$DESP 002076 G	L10016 006502	O\$SETU= 000000	SVEC = 104000 G
I\$SETU= 000041	L\$DEVP 002060 G	L10017 006526	PATCH 014420	SWE = 000010 G
I\$SFT = 000041	L\$DISP 013016 G	L10020 006530	PAUSE1 005254	SWTCH = 170200 G
I\$SRV = 000041	L\$DLY 002116 G	L10021 007430	PAUS.5 005262	SYNC = 164001 G
I\$SUB = 000041	L\$DTP 002040 G	L10022 007166	PAU.01 005270	S\$LSYM= 010000
I\$TST = 000041	L\$DTYP 002034 G	L10023 007320	PNT = 001000 G	TEMP1 002736 G
JSMV 002700 G	L\$DU 006326 G	L10024 007416	PRI = 002000 G	TEMP2 002740 G
JSSV 002704 G	L\$DUT 002072 G	L10025 007604	PRI00 = 000000 G	TEMP3 002742 G
JS0 = 000000 G	L\$DVTY 002156 G	L10026 011276	PRI01 = 000040 G	TESTK 005472
JS1 = 000400 G	L\$EF 002052 G	L10027 013012	PRI02 = 000100 G	THRSH 010766
JS2 = 001000 G	L\$ENVI 002044 G	L255 = 002377 G	PRI03 = 000140 G	TN = 000004
JS3 = 001400 G	L\$ERRT 003222 G	MAIER 004102	PRI04 = 000200 G	TNAM 005470
J\$JMP = 000167	L\$ETP 002102 G	MAINT 007502	PRI05 = 000240 G	TOL 002516
K100US 005322	L\$EXP1 002046 G	MAXX = 001776 G	PRI06 = 000300 G	TOLER 010420
LAIER 003677	L\$EXP4 002064 G	MAXY = 001776 G	PRI07 = 000340 G	TOTV 002702 G
LAIEW 003741	L\$EXP5 002066 G	MAXY50= 001776 G	PROTEC= 176000 G	TSTDAC 010212
LBLU = 002400	L\$SHARD 002236 G	MAXY60= 001676 G	QVP 002654 G	TSTEND 005474
LDI = 002000 G	L\$HIME 002120 G	MBLU = 005000	RD 014316	TSTGO 005422
LDINC 004004	L\$HPCP 002016 G	MDV0 = 000000 G	RDAC 011136	TSARGC= 000001
LDR 002670 G	L\$HPTP 002022 G	MDV1 = 000001 G	RDERR 004227	TSCODE= 000142
LDUN 004652	L\$HW 002222 G	MDV2 = 000002 G	RDWRT = 176074 G	TSERRN= 000311
LGRN = 000120	L\$ICP 002104 G	MDV3 = 000003 G	RDWRT1= 176076 G	TSEXCP= 000000
LINTER 003030 G	L\$INIT 005652 G	MGRN = 000240	READ = 176050 G	TSFLAG= 000040
LINTX 003662	L\$LADP 002026 G	MRED = 000012	REC 011070	TSGMAN= 000000
LMER 004151	L\$LAST 015004 G	MRWERR 003172 G	RED = 000017	TSHILI= 000001
LMR 002672 G	L\$LOAD 002100 G	MSX = 020000 G	REDC = 000020 G	TSLAST= 000001
LOE = 040000 G	L\$LUN 002074 G	MSY = 000100 G	REDSUM 010550	T\$LOLI= 000001
LOOP 005374	L\$MREV 002050 G	MXY = 020000 G	RED1 007752	T\$LSYM= 010000
LOOPK 005420	L\$NAME 002000 G	M1 002312	RELEAS 004766	T\$LTNO= 000004
LOT = 000010 G	L\$PRIO 002042 G	M128 = 000002 G	RPNT = 130000 G	T\$NEST= 000000
LREAD = 010000 G	L\$PROT 006316 G	M2 002345	RSPEC 011176	T\$NSO = 000011
LRED = 000005	L\$PRT 002112 G	M256 = 000003 G	RSPEC1 011236	T\$NS1 = 000001
LRWERR 003062 G	L\$REPP 002062 G	M3 002401	R256 = 000100 G	T\$NS2 = 000002
LRWX 004031	L\$REV 002010 G	M32 = 000000 G	SETCB = 152000 G	T\$PTNU= 000000
LSET = 010000 G	L\$RPT 006530 G	M4 002426	SETHB = 150000 G	T\$SAVL= 177777
LSR 002666 G	L\$SOFT 002522 G	M5 002461	SETMEM= 170100 G	T\$SEGL= 177777
LUMIN 005016	L\$SPC 002056 G	M64 = 000001 G	SETRR = 000014 G	T\$SUBN= 000000
LUMTBL 013026	L\$SPCP 002020 G	NEWPAS 005736	SFPTBL 002516 G	T\$TAGL= 177777
LUTAI 007022	L\$SPTP 002024 G	NLRI 003430	SHADLY 002732 G	T\$TAGN= 010030
LUTAV 002730 G	L\$STA 002030 G	NLWI 003504	SHAD16 005132	T\$TEMP= 000005
LUTCLR 007172	L\$SW 002516 G	NTSC 005030	SIOFF = 171000 G	T\$TEST= 000004
LUTGAV 007702	L\$TEST 002114 G	NTSC8 014030	SION = 171400 G	T\$TSTM= 177777
LUTGSD 007324	L\$TIML 002014 G	NULL 011123	SKP0 = 000400	T\$TSTS= 000001
LUTSAV 004656	L\$UNIT 002012 G	NXM 005324	SKP1 = 000401	T\$SAU = 010016
LUTTST 006570	LO = 002000 G	NXR 003350	SKP2 = 000402	T\$SAUT= 010014
LUTV 002706 G	L10000 002234	NXRERR 003000 G	SKP3 = 000403	T\$SCLE= 010017
LVEC = 110000 G	L10001 002514	NXR 003407	SM1 002532	T\$SDU = 010015
L\$ACP 002110 G	L10002 002520	NXTU 005750	START 005716	T\$SHAR= 010001
L\$APT 002036 G	L10003 002652	ONEFIL= 000001	STOP = 172000 G	T\$SHW = 010000
L\$AU 006422 G	L10004 002776	O\$APTS= 000000	STOPI = 173400 G	T\$SINI= 010012

CZVSVA0 COLOUR LOOKUP OPTION MACRO M1200 28-APR-83 14:05 PAGE 42-3
 SYMBOL TABLE

T\$\$MSG= 010011	T1.1	007020	ULRI	003561	WAITF	005214	X\$OFFS= 000400
T\$\$PRO= 010013	T1.2	007170	ULWI	003621	WRT =	176034 G	X\$TRUE= 000020
T\$\$RPT= 010020	T1.3	007322	US100	005276	WRT1 =	176036 G	Y50TBL 012412
T\$\$SOF= 010003	T2	007432 G	UTO	003246	WT	014376	Y60TBL 012432
T\$\$SUB= 010024	T3	007606 G	UTOERR	002744 G	XTBL	012412	.DX = 020400
T\$\$SW = 010002	T4	011300 G	UTOX	003314	X\$ALWA=	000000	.DY = 000000
T\$\$TES= 010027	UAM	= 000200 G	UUT	002652 G	X\$FALS=	000040	.I = 040000
T1							

. ABS. 015004 000
 000000 001

ERRORS DETECTED: 0

VIRTUAL MEMORY USED: 38120 WORDS (149 PAGES)
 DYNAMIC MEMORY: 20060 WORDS (77 PAGES)
 ELAPSED TIME: 00:03:52
 ZVSVA0.BIN,ZVSVA0.LST/-SP=LB:SYSMAC/ML, LB:SVC34R/ML, SY:ZVSVA0