```
(RPAQQ VIRTUALKEYBOARDSCOMS
       ((FNS FINDVIRTUALKEYBOARD PROCESS.KEYBOARD VKBD.CREATE-KEYACTION-TABLE VKBD.WINDOWMENUFN
             VKBD.WINDOWMENUINIT)
        (COMS (FNS LOADKEYBOARDDISPLAYFONTS)
              (INITVARS VKBD.CACHEDCHARSETS)
              (GLOBALVARS VKBD.CACHEDCHARSETS))
        (FNS DEFINEKEYBOARD)
        (FNS VKBD.ADD-ITEM-TO-BACKGROUND-MENU VKBD.INIT VKBD.CREATE-DEFAULT-KEYBOARD VKBD.ADD-DEFAULT-KEYBOARD)
        (FNS VKBD.LOAD-FILE-COMMAND VKBD.LOAD-KEYBOARD-FILE VKBD.STORE-FILE-COMMAND VKBD.STORE-KEYBOARD-FILE)
        (FNS SWITCHKEYBOARDS VKBD.POP-MENU-AND-SWITCH-KEYBOARDS VKBD.POP-UP-KEYBOARDS-MENU
             VKBD.GET-CONFIGURATION VKBD.SUBCONFIGURATION)
        (FNS VKBD.BUTTONEVENTFN VKBD.CENTER-BITMAP-IN-REGION VKBD.CLEAR-KEY-DISPLAY VKBD.CREATE-KEYBOARD-BITMAP
             VKBD.CREATE-KEYBOARD-DISPLAY VKBD.CURSORMOVEDFN VKBD.DISPLAY-CHARACTER VKBD.DISPLAY-EMPTY-KEY-CAP
             VKBD.DISPLAY-KEY VKBD.DISPLAY-KEY-CHARACTERS VKBD.DRAW-KEY-CAPS VKBD.ERASE-FRAME VKBD.EXTEND-REGION
             VKBD.GET-KEY-AND-REGIONS-OF-CURSOR-POSITION VKBD.GET-KEY-REGIONS VKBD.INVERT-KEY VKBD.INVERT-REGION
             VKBD.KEYBOARD-WINDOW-REPAINTFN VKBD.LOWER-HALF-REGION VKBD.POSITION-IS-IN-KEY-REGION
             VKBD.REMOVE-KEYBOARD-COMMAND VKBD.UNION-REGIONS VKBD.UPPER-HALF-REGION)
        (FNS VKBD.KEY-ASSOC VKBD.CHAR-ASSIGNMENTP VKBD.COMPLETE-KEYBOARD VKBD.CTRL-ASSIGNMENTP
             VKBD.EVENT-ASSIGNMENTP VKBD.META-ASSIGNMENTP VKBD.FRAME-KEY VKBD.GET-CURRENT-KEY-ASSIGNMENT
             VKBD.GET-NON-CHAR-LABEL VKBD.ICONFN VKBD.INVERT-LOCK-KEYS VKBD.INVERT-SHIFT-KEYS
             VKBD.TRANSLATE-KEY-ID VKBD.KEY-ID-TO-KEY-NAMES VKBD.KEYBOARD-IS-KEYBOARDTYPE-KEYBOARD
             VKBD.LOCK-ASSIGNMENTP VKBD.LOCK-KEYP VKBD.LOCK/NOLOCK VKBD.LOCKDOWN-ASSIGNMENTP
             VKBD.LOCKUP-ASSIGNMENTP VKBD.PARSE-CHAR-CODE VKBD.PARSE-KEY-ASSIGNMENT VKBD.RESET-KEYBOARD-WINDOW
             VKBD.SEND-CHARACTER VKBD.SHIFT-ASSIGNMENTP VKBD.SHIFTED-CHAR VKBD.UNDEFINE-KEYBOARD
             VKBD.UNSHIFTED-CHAR)
        (ALISTS (CHARACTERNAMES BREAK HOME PGUP END PGDN INS HELP SCRL NUMLK CLEAR DOIT CENTER NOTCENTER BOLD
                        NOTBOLD ITALIC NOTITALIC UCASE LCASE STRIKEOUT NOTSTRIKEOUT UNDERLINE NOTUNDERLINE
                        SUBSCRIPT SUPERSCRIPT SMALLER LARGER MARGINS NOTMARGINS LOOKS NOTLOOKS F11 NOTF11 F12
                        NOTF12))
        (RECORDS KEYBOARDCONFIGURATION VIRTUALKEYBOARD)
        (INITVARS (VKBD.LOADED-KEYBOARDS NIL)
              (VKBD.KNOWN-KEYBOARDS NIL))
        (FILES (SOURCE)
               KEYBOARDCONFIGS)
        (VARS VKBD.BACKGROUND-MENU-SUBITEMS VKBD.NON-CHAR-ASSIGNMENTS-LABELS VKBD.WINDOW-MENU-SUBITEMS)
        (BITMAPS VKBD.ICON VKBD.MASK)
        (GLOBALVARS VKBD.BACKGROUND-MENU-SUBITEMS VKBD.DEFAULT-CONFIGURATION-NAME VKBD.KNOWN-KEYBOARDS
              VKBD.NON-CHAR-ASSIGNMENTS-LABELS VKBD.ICON VKBD.MASK CURRENTKEYBOARDCONFIG VKBD.CONFIGURATIONS
              VKBD.COMMONCODELABELS VKBD.COMMONKEYLABELS VKBD.COMMONDEFAULTASSIGNMENT)
        (INITVARS (CURRENTKEYBOARDCONFIG NIL))
        (COMS (DECLARE\: FIRST (P (MOVD? '\\KEYBOARDEVENTFN '\\OLDKEYBOARDEVENTFN)))
              (INITVARS (\\ORIGINALDEFAULTKEYACTION))
              (FNS VKBD.\\KEYBOARDEVENTFN VKBD.RESETKEYACTIONTABLES)
              (P (MOVD 'VKBD.\\KEYBOARDEVENTFN '\\KEYBOARDEVENTFN)))
        (COMS (DECLARE\: FIRST (P (MOVD? 'KEYACTION 'OLDKEYACTION)))
              (FNS NEWKEYACTION)
              (P (MOVD 'NEWKEYACTION 'KEYACTION))
              (INITVARS (MODEKEYS))
              (VARS MODEACTIONS)
              (GLOBALVARS MODEKEYS MODEACTIONS))
        (ADDVARS (BREAKRESETFORMS ((LAMBDA (K)
                                          (PROCESS.KEYBOARD NIL K))
                                  'DEFAULT)))
        (FNS FIXKEYBOARD FIXKEYBOARDCONFIG FIXKEYASSIGNMENTS)
        (DECLARE\: DONTEVAL@LOAD DOCOPY (P (VKBD.INIT)))
        (COMS (P (MOVD? 'METASHIFT 'OLDMETASHIFT))
              (FNS METASHIFT)
                                                     ; Call new definition if the old one had been called
              (P (AND (MEMB (KEYBOARDTYPE)
                            '(X DORADO))
                      (EQUAL (KEYACTION 'BLANK-BOTTOM)
                             '(METADOWN . METAUP))
                      (METASHIFT T))))
        (FILES ICONW)
        (DECLARE\: DONTEVAL@LOAD DOEVAL@COMPILE DONTCOPY COMPILERVARS (ADDVARS (NLAMA)
                                                                        (NLAML)
                                                                        (LAMA METASHIFT)))))


(DEFINEQ

(FINDVIRTUALKEYBOARD
```

```
(LAMBDA (KEYBOARDNAME CONFIGURATIONNAME)                               ; Edited 27-Feb-96 10:27 by rmk
  (LET ((KBTYPE (COND
                 (CONFIGURATIONNAME)
                 ((LISTP KEYBOARDNAME)
                  (FETCH (VIRTUALKEYBOARD KEYBOARDCONFIGURATION) OF KEYBOARDNAME))
                 ((KEYBOARDTYPE))
                 (T DEFAULTVIRTUALKEYBOARDTYPE))))
        (CL:WHEN (AND (LISTP KEYBOARDNAME)
                      (MEMB KEYBOARDNAME VKBD.KNOWN-KEYBOARDS))
```

        ;; Gave a keyboard, use it to indicate keyboard name for new configuration

```
              (SETQ KEYBOARDNAME (FETCH (VIRTUALKEYBOARD KEYBOARDNAME) OF KEYBOARDNAME)))
```

;; Find keyboard of default type if current type doesn't exist and CONFIGURATIONNAME wasn't given--PROCESS.KEYBOARD won't
;; switch this in. Note that a keyboard that has a NIL configuration is declared to go with anything,but we look for an explicit match first

```
        (IF (FIND KB IN VKBD.KNOWN-KEYBOARDS SUCHTHAT (AND (EQ KEYBOARDNAME (FETCH (VIRTUALKEYBOARD
                                                                                     KEYBOARDNAME)
                                                                            OF KB))
                                                           (EQ KBTYPE (FETCH (VIRTUALKEYBOARD
                                                                              KEYBOARDCONFIGURATION)
                                                                      OF KB))))
            ELSEIF (FIND KB IN VKBD.KNOWN-KEYBOARDS SUCHTHAT (AND (EQ KEYBOARDNAME (FETCH (VIRTUALKEYBOARD
                                                                                           KEYBOARDNAME)
                                                                                  OF KB))
                                                                 (NULL (FETCH (VIRTUALKEYBOARD
                                                                               KEYBOARDCONFIGURATION)
                                                                        OF KB))))
            ELSEIF (OR (NOT CONFIGURATIONNAME)
                       (EQ CONFIGURATIONNAME KBTYPE))
              THEN (OR (FOR C IN (CDR (ASSOC KBTYPE KEYBOARDCONFIGCOERCIONS)) WHEN (SETQ C (
                                                                                       FINDVIRTUALKEYBOARD
                                                                                            KEYBOARDNAME C))
                         DO (RETURN C))
                       (AND DEFAULTVIRTUALKEYBOARDTYPE (NEQ DEFAULTVIRTUALKEYBOARDTYPE KBTYPE)
                            (FOR KB IN VKBD.KNOWN-KEYBOARDS WHEN (AND (EQ KEYBOARDNAME (FETCH (VIRTUALKEYBOARD
                                                                                              KEYBOARDNAME)
                                                                                     OF KB))
                                                                     (EQ DEFAULTVIRTUALKEYBOARDTYPE
                                                                         (FETCH (VIRTUALKEYBOARD
                                                                                 KEYBOARDCONFIGURATION)
                                                                          OF KB)))
                              DO (RETURN KB)))))))))
```

(**PROCESS.KEYBOARD**
```
  (LAMBDA (PROCESS/WINDOW KEYBOARD)                                    ; Edited 23-May-95 17:00 by rmk:
```

;;; Get/set the keyboard just for this process/window. Value is previous keyboard.

```
  (PROG (KEYACTIONTABLE FOUND (PROCESS (COND
                                        ((NULL PROCESS/WINDOW)
                                         (TTY.PROCESS))
                                        ((PROCESSP PROCESS/WINDOW)
                                         PROCESS/WINDOW)
                                        ((AND (WINDOWP PROCESS/WINDOW)
                                              (WINDOWPROP PROCESS/WINDOW 'PROCESS)))
                                        (T (THIS.PROCESS)))))
        (COND
          ((SETQ KEYACTIONTABLE (IF (AND KEYBOARD (SETQ FOUND (FINDVIRTUALKEYBOARD KEYBOARD)))
                                  THEN  ;; We believe in whatever FINDVIRTUALKEYBOARD returns, even though it might not have
                                        ;; the configuration we expect.
                                                ; Get/create the KEYACTIONTABLE for the FOUND
                                        (VKBD.CREATE-KEYACTION-TABLE FOUND)))
                                                ; Make sure to copy the current interrupt list.
            (REPLACE (KEYACTION INTERRUPTLIST) OF KEYACTIONTABLE
               WITH (COPY (FETCH (KEYACTION INTERRUPTLIST) OF (OR (PROCESSPROP PROCESS 'KEYACTION)
                                                                  \\DEFAULTKEYACTION))))
            (PROCESSPROP PROCESS 'KEYACTION KEYACTIONTABLE)
            (COND
              ((TTY.PROCESSP PROCESS)                                  ; install the key action table
                                                                       ; Hack--wait until dangerous shifts are up
                (|while| (OR (SHIFTDOWNP 'META)
                             (SHIFTDOWNP 'CTRL)))
                (SETQ \\CURRENTKEYACTION (OR KEYACTIONTABLE (KEYACTIONTABLE)))))
            (RETURN (OR (PROCESSPROP PROCESS 'KEYBOARD KEYBOARD)
                        'DEFAULT)))
          (T (RETURN (OR (PROCESSPROP PROCESS 'KEYBOARD)
                         'DEFAULT)))))))
```

(**VKBD.CREATE-KEYACTION-TABLE**
```
  (LAMBDA (NEW-KEYBOARD OLDTABLE)                                      ; Edited 28-Jun-2023 11:52 by rmk
                                                                       ; Edited 29-Feb-96 12:32 by rmk
    (PROG (KEYBOARDNAME FOUND KEYACTION-TABLE CONFIG)
          (CL:UNLESS (COND
                       ((AND (ATOM NEW-KEYBOARD)
                             (SETQ FOUND (FINDVIRTUALKEYBOARD NEW-KEYBOARD)))
```

```
                            (SETQ NEW-KEYBOARD FOUND))
                        ((MEMB NEW-KEYBOARD VKBD.KNOWN-KEYBOARDS)))
            ;; Use FOUND to preserve NEW-KEYBOARD for error

            (ERROR "INVALID KEYBOARD" NEW-KEYBOARD))
        (SETQ KEYBOARDNAME (FETCH (VIRTUALKEYBOARD KEYBOARDNAME) OF NEW-KEYBOARD))
        (COND
            (OLDTABLE (SETQ KEYACTION-TABLE (RESETKEYACTION OLDTABLE)))
            ((SETQ KEYACTION-TABLE (GETPROP KEYBOARDNAME 'KEYACTIONTABLE))
             (RETURN KEYACTION-TABLE))
            (T (SETQ KEYACTION-TABLE (KEYACTIONTABLE))))
        (SETQ NEW-KEYBOARD (VKBD.COMPLETE-KEYBOARD NEW-KEYBOARD))
        (SETQ CONFIG (VKBD.GET-CONFIGURATION (FETCH (VIRTUALKEYBOARD KEYBOARDCONFIGURATION) OF NEW-KEYBOARD)
                            ))
        (FOR KEY-ASSIGNMENT IN (FETCH (VIRTUALKEYBOARD COMPLETEKEYASSIGNMENTS) OF NEW-KEYBOARD)
           DO (CL:UNLESS (MEMB (CAR KEY-ASSIGNMENT)
                               '(31 86))
                  (OLDKEYACTION (CAR KEY-ASSIGNMENT)
                               (CDR KEY-ASSIGNMENT)
                               KEYACTION-TABLE)))
        (PUTPROP KEYBOARDNAME 'KEYACTIONTABLE KEYACTION-TABLE)
        (RETURN KEYACTION-TABLE))))
```

(**VKBD.WINDOWMENUFN**
```
  (LAMBDA (W)                                                    ; Edited 15-Dec-87 16:27 by Snow
    (LET (KEYBOARD)
        (SETQ KEYBOARD (VKBD.POP-UP-KEYBOARDS-MENU))
        (AND KEYBOARD (PROCESS.KEYBOARD W KEYBOARD)))))
```

(**VKBD.WINDOWMENUINIT**
```
  (LAMBDA NIL                                                    ; Edited 15-Dec-87 16:28 by Snow
    (SETQ |WindowMenuCommands| (REMOVE (SASSOC '|Keyboard| |WindowMenuCommands|)
                                        |WindowMenuCommands|))
    (NCONC1 |WindowMenuCommands| '(|Keyboard| (FUNCTION (LAMBDA (W)
                                               (SWITCHKEYBOARDS T NIL W)))
                                  "Changes the keyboard associated with this window."
                                  ,VKBD.WINDOW-MENU-SUBITEMS))
    (SETQ |WindowMenu| NIL)))
```

)

(DEFINEQ

(**LOADKEYBOARDDISPLAYFONTS**
```
  (LAMBDA (FONT)                                                ; Edited 13-Dec-96 17:40 by rmk:
                                                                ; Edited  7-Mar-96 12:30 by rmk
```

;; Insures that all the characters on virtual keycaps have been instantiated in FONT (or at least on the keycaps). Saves the needed charsets in
;; VKBD.CACHEDCHARSETS. This means that we don't have to parse all the keyboards every time. In order to make use of the cache, we
;; instantiate all the charsets in all the fonts that are specified in any of the keyboards or configurations.

```
    (DECLARE (GLOBALVARS VKBD.CACHEDCHARSETS))
    (CL:UNLESS VKBD.CACHEDCHARSETS
        (FOR K IN VKBD.KNOWN-KEYBOARDS DO
```

;; Ignore errorful transitions in this background function, fail when the user actually asks for the
;; keyboard. Accumulate 0th character in each charset (presumably very few), saving them in the
;; cache.

```
                        (FOR A TRANS CHARSETS IN (FETCH KEYASSIGNMENTS OF K)
                           WHEN (NLSETQ (SETQ A (VKBD.PARSE-KEY-ASSIGNMENT A NIL T)))
                           DO (CL:WHEN (LISTP (SETQ TRANS (CADR A)))
                                   (PUSHNEW VKBD.CACHEDCHARSETS (LOGAND (CAR TRANS)
                                                                       (CHARCODE 377\,0)))
                                   (PUSHNEW VKBD.CACHEDCHARSETS (LOGAND (CADR TRANS)
                                                                       (CHARCODE 377\,0))))
                              (CL:WHEN (LISTP (SETQ TRANS (CDDR A)))
                                   (PUSHNEW VKBD.CACHEDCHARSETS (LOGAND (CAR TRANS)
                                                                       (CHARCODE 377\,0)))
                                   (PUSHNEW VKBD.CACHEDCHARSETS (LOGAND (CADR TRANS)
                                                                       (CHARCODE 377\,0)))))
                        )
        (FOR CONFIG COMMON IN VKBD.CONFIGURATIONS DO
```

;; We aren't letting the configs assignment override the VKBD.COMMONDEFAULTASSIGNMENT on
;; the same key. Thus, in principle we could be instantiating a font that isn't actually needed, but this
;; is unlikely, harmless, and not worth the bother to keep track. VKBD.COMPLETE-KEYBOARD does
;; it right.

```
                        (FOR A TRANS IN (APPEND (FETCH DEFAULTASSIGNMENT
                                                       OF CONFIG)
                                                VKBD.COMMONDEFAULTASSIGNMENT)
                           WHEN (NLSETQ (SETQ A (VKBD.PARSE-KEY-ASSIGNMENT A
                                                          CONFIG)))
                           DO (CL:WHEN (LISTP (SETQ TRANS (CADR A)))
                                   (PUSHNEW VKBD.CACHEDCHARSETS
                                           (LOGAND (CAR TRANS)
                                                   (CHARCODE 377\,0)))
```

```
                                                (PUSHNEW VKBD.CACHEDCHARSETS
                                                        (LOGAND (CADR TRANS)
                                                                (CHARCODE 377\,0)))))
                                         (CL:WHEN (LISTP (SETQ TRANS (CDDR A)))
                                                (PUSHNEW VKBD.CACHEDCHARSETS
                                                        (LOGAND (CAR TRANS)
                                                                (CHARCODE 377\,0)))
                                                (PUSHNEW VKBD.CACHEDCHARSETS
                                                        (LOGAND (CADR TRANS)
                                                                (CHARCODE 377\,0))))))))
                    (SETQ VKBD.CACHEDCHARSETS (DREMOVE 0 VKBD.CACHEDCHARSETS)))
          (IF FONT
              THEN (SETQ FONT (FONTCREATE FONT NIL NIL NIL 'DISPLAY))
                   (FOR C IN VKBD.CACHEDCHARSETS DO (CHARWIDTH C FONT))
            ELSE (LET (DONEFONTS)
                      (FOR K F IN VKBD.KNOWN-KEYBOARDS UNLESS (MEMB (SETQ F (FONTCREATE (OR (FETCH (VIRTUALKEYBOARD

                                                                                                     KEYBOARDDISPLAYFONT
                                                                                                     )
                                                                                                OF K)

                                                                                           DEFAULTKEYBOARDDISPLAYFONT
                                                                                           )
                                                                                NIL NIL NIL 'DISPLAY))
                                                                        DONEFONTS)
                       DO (PUSH DONEFONTS F)
                          (FOR C IN VKBD.CACHEDCHARSETS DO (CHARWIDTH C F)))
                      (FOR CONFIG F IN VKBD.CONFIGURATIONS UNLESS (MEMB (SETQ F (FONTCREATE
                                                                        (OR (FETCH (KEYBOARDCONFIGURATION
                                                                                    KEYBOARDDISPLAYFONT)
                                                                                OF CONFIG)
                                                                            DEFAULTKEYBOARDDISPLAYFONT)
                                                                        NIL NIL NIL 'DISPLAY))
                                                                        DONEFONTS)
                       DO (PUSH DONEFONTS F)
                          (FOR C IN VKBD.CACHEDCHARSETS DO (CHARWIDTH C F)))))))
)

(RPAQ? VKBD.CACHEDCHARSETS NIL)

(DECLARE\: DOEVAL@COMPILE DONTCOPY

(GLOBALVARS VKBD.CACHEDCHARSETS)
)

(DEFINEQ
```

(**DEFINEKEYBOARD**
```
  (LAMBDA (KEYBOARD-OBJECT)                                    ; Edited 28-Feb-96 11:41 by rmk
                                                               ; Edited 15-Dec-87 16:29 by Snow

    ;; Checks assignments before it installs, returns a copy unless the object is already known.

    (FOR KEY-ASSIGNMENT (CONFIGURATION _ (VKBD.GET-CONFIGURATION (FETCH (VIRTUALKEYBOARD KEYBOARDCONFIGURATION
                                                                        )
                                                                OF KEYBOARD-OBJECT)))
       IN (FETCH (VIRTUALKEYBOARD KEYASSIGNMENTS) OF KEYBOARD-OBJECT) DO (VKBD.PARSE-KEY-ASSIGNMENT
                                                                          KEY-ASSIGNMENT CONFIGURATION))
       (OR (FINDVIRTUALKEYBOARD KEYBOARD-OBJECT)
           (CAR (PUSH VKBD.KNOWN-KEYBOARDS (COPY KEYBOARD-OBJECT))))))))
)

(DEFINEQ
```

(**VKBD.ADD-ITEM-TO-BACKGROUND-MENU**
```
  (LAMBDA (LABEL COMMAND MESSAGE SUBITEMLIST)                  ; Edited 15-Dec-87 16:29 by Snow
    (SETQ |BackgroundMenuCommands| (REMOVE (SASSOC LABEL |BackgroundMenuCommands|)
                                           |BackgroundMenuCommands|))
    (NCONC1 |BackgroundMenuCommands| (LIST LABEL COMMAND MESSAGE SUBITEMLIST))
    (SETQ |BackgroundMenu| NIL)))
```

(**VKBD.INIT**
```
  (LAMBDA NIL                                                  ; Edited  6-Jul-2023 15:14 by rmk
                                                               ; Edited 28-Jun-2023 10:40 by rmk
                                                               ; Edited 14-Jun-2017 14:22 by kaplan
                                                               ; Edited 16-Jun-92 11:14 by kaplan

    ;; Reads virtual keyboard file for current type (or default type), if it can be found.  Keyboards that don't match current keyboard can be displayed but
    ;; not installed (via PROCESS.KEYBOARD)

    (CL:UNLESS \\ORIGINALDEFAULTKEYACTION
        (SETQ \\ORIGINALDEFAULTKEYACTION (KEYACTIONTABLE \\DEFAULTKEYACTION)))
    (SETQ VKBD.COMMONCODELABELS (FOR X IN VKBD.COMMONCHARLABELS
                                    COLLECT (IF (LISTP X)
                                                THEN (IF (SMALLP (CAR X))
                                                         THEN X
```

```
                                                    ELSE (LIST (CHARCODE.DECODE (CAR X))
                                                               (CADR X))))
                                      ELSE (LIST (CHARCODE.DECODE X)
                                                 X))))
          (VKBD.ADD-ITEM-TO-BACKGROUND-MENU "Keyboard" '' (SWITCHKEYBOARDS T NIL)
              "Displays a menu for switching keyboards" VKBD.BACKGROUND-MENU-SUBITEMS)
          (VKBD.WINDOWMENUINIT)
          (LET ((KT (KEYBOARDTYPE)))
               (SETQ CURRENTKEYBOARDCONFIG (VKBD.GET-CONFIGURATION KT))
               (CL:WHEN (VKBD.LOAD-KEYBOARD-FILE KT)

                     ;; Loading a keyboard file may change our notion of KEYBOARDTYPE, because of new coercion paths.  The default keyboard will be
                     ;; added for the new type

                     (VKBD.ADD-DEFAULT-KEYBOARD)))))
```

(**VKBD.CREATE-DEFAULT-KEYBOARD**

```
  (LAMBDA (CONFIGURATION)                                               ; Edited 27-Feb-96 20:51 by rmk

    ;; Don't bother copying in the default keyassignments, since they will always be inserted by VKBD.COMPLETE-KEYBOARD

    (CL:WHEN (SETQ CONFIGURATION (VKBD.GET-CONFIGURATION CONFIGURATION))
         (CREATE VIRTUALKEYBOARD
                 KEYBOARDNAME _ 'DEFAULT
                 KEYBOARDCONFIGURATION _ (FETCH (KEYBOARDCONFIGURATION CONFIGURATIONNAME) OF CONFIGURATION)))))
```

(**VKBD.ADD-DEFAULT-KEYBOARD**

```
  (LAMBDA (KEYBOARDTYPE)                                                ; Edited 28-Jun-2023 10:45 by rmk
                                                                        ; Edited 23-May-95 17:04 by rmk:
```

;;; It is useful practice to be able to switch back to the original key assignments. Thus the program is adding one special keyboard with the name
;;; DEFAULT which is the current keyboardtype's default keyboard.

```
    (SETQ KEYBOARDTYPE (OR KEYBOARDTYPE (KEYBOARDTYPE)))
    (BIND DEFAULT WHILE (SETQ DEFAULT (FINDVIRTUALKEYBOARD 'DEFAULT KEYBOARDTYPE))
       DO (SETQ VKBD.KNOWN-KEYBOARDS (REMOVE DEFAULT VKBD.KNOWN-KEYBOARDS)))
    (SETQ VKBD.KNOWN-KEYBOARDS (CONS (VKBD.CREATE-DEFAULT-KEYBOARD KEYBOARDTYPE)
                                    VKBD.KNOWN-KEYBOARDS))
    (COND
      ((EQ KEYBOARDTYPE (KEYBOARDTYPE))
       (VKBD.CREATE-KEYACTION-TABLE 'DEFAULT \\DEFAULTKEYACTION)))))

)

(DEFINEQ
```

(**VKBD.LOAD-FILE-COMMAND**

```
  (LAMBDA (REDEFINE? DELETE-FIRST?)                                     ; Edited  3-Mar-96 18:16 by rmk
                                                                        ; Edited 15-Dec-87 16:30 by Snow
    (LET (F)
         (SETQ F (MKATOM (PROMPTFORWORD "Keyboard file name: " NIL NIL PROMPTWINDOW NIL 'TTY)))
         (IF F
             THEN (VKBD.LOAD-KEYBOARD-FILE F REDEFINE? DELETE-FIRST? T)))))
```

(**VKBD.LOAD-KEYBOARD-FILE**

```
  (LAMBDA (KEYBOARDTYPE REDEFINE? DELETE-CURRENT-DEFINITIONS?)    ; Edited  6-Jul-2023 15:11 by rmk
                                                                 ; Edited  4-Jul-2023 23:22 by rmk
    (CL:UNLESS KEYBOARDTYPE (SETQ KEYBOARDTYPE DEFAULTVIRTUALKEYBOARDTYPE))

    ;; Returns T if keyboards of type KEYBOARDTYPE found. Prints prompt warning and returns NIL if not found.

    ;; Note:  Can't switch to READFILE, since it uses OLD-INTERLISP readtable which doesn't honor vertical bars around numeric atoms.

    (LET (FILE (VKBDDIRS (CONS (MEDLEYDIR "library/virtualkeyboards/")
                              LISPUSERSDIRECTORIES))
               (NEWKEYBOARDS (CDR (ASSOC KEYBOARDTYPE VKBD.LOADED-KEYBOARDS))))
         (CL:UNLESS NEWKEYBOARDS

             ;; If keyboards of type KEYBOARDTYPE have not previously been loaded, we look for a file <KEYBOARDTYPE>KEYBOARDS (e.g.
             ;; XKEYBOARDS, SDLKEYBOARDS), defaulting to the directory that VIRTUALKEYBOARDS is coming from.  It is assumed that that
             ;; file will add the desired keyboards to VKBD.LOADED-KEYBOARDS,

             (CL:WHEN (SETQ FILE (FINDFILE (PACK* KEYBOARDTYPE "KEYBOARDS")
                                           T VKBDDIRS))
                  (LOAD FILE T)
                  (SETQ NEWKEYBOARDS (CDR (ASSOC KEYBOARDTYPE VKBD.LOADED-KEYBOARDS)))))
         (|if| NEWKEYBOARDS
             |then| (COND
                      (DELETE-CURRENT-DEFINITIONS? (SETQ VKBD.KNOWN-KEYBOARDS NEWKEYBOARDS)
                            (VKBD.ADD-DEFAULT-KEYBOARD))
                      (T (FOR NEWKEYBOARD KN KC IN NEWKEYBOARDS
                            DO  ;; To make sure that COMPLETEDASSIGNMENTS cell (or any other new cells) exist--backward compatibility

                                (SETQ NEWKEYBOARD (CREATE VIRTUALKEYBOARD USING NEWKEYBOARD))
                                (SETQ KN (FETCH KEYBOARDNAME OF NEWKEYBOARD))
                                (SETQ KC (FETCH KEYBOARDCONFIGURATION OF NEWKEYBOARD))
                                (FOR TAIL OLDKEYBOARD ON VKBD.KNOWN-KEYBOARDS
                                   WHEN (AND (EQ KN (FETCH KEYBOARDNAME OF (SETQ OLDKEYBOARD (CAR TAIL))))
                                             (EQ KC (FETCH KEYBOARDCONFIGURATION OF OLDKEYBOARD)))
```

```
                                              DO  ;; If REDEFINE?, then replace one with same name and configuration.  Otherwise, keep the old one
                                                  ;; instead of installing the new one.

                                                  (COND
                                                     (REDEFINE? (RPLACA TAIL NEWKEYBOARD))
                                                     (T (RETURN)))
                                              FINALLY (SETQ VKBD.KNOWN-KEYBOARDS (NCONC1 VKBD.KNOWN-KEYBOARDS NEWKEYBOARD)))
                               )))
                   T
           |else| (PROMPTPRINT "Note: Can't find virtual keyboard file for " KEYBOARDTYPE " keyboards")
                  NIL))))
```

(**VKBD.STORE-FILE-COMMAND**
```
  (LAMBDA (F)                                                  ; Edited 15-Dec-87 16:31 by Snow
    (SETQ F (PROMPTFORWORD "ENTER FILE NAME: " NIL NIL PROMPTWINDOW NIL 'TTY))
    (|if| F
        |then| (VKBD.STORE-KEYBOARD-FILE (MKATOM F))
     |else| (PROMPTPRINT "FILE NOT FOUND"))))
```

(**VKBD.STORE-KEYBOARD-FILE**
```
  (LAMBDA (FILENAME CONFIGURATIONNAME)                          ; Edited  4-Mar-96 13:38 by rmk

    ;; COMPLETEDKEYASSIGNMENTS are in a separate hasharray, don't get printed.  Can't use WRITEFILE because of vertical-bar problems

    (CL:WITH-OPEN-FILE (STREAM FILENAME :DIRECTION :OUTPUT :IF-EXISTS :NEW-VERSION)
        (LET ((RDTBL (FIND-READTABLE "INTERLISP")))
            (PRINT (DATE)
                   STREAM RDTBL)
            (IF CONFIGURATIONNAME
                THEN (FOR KB IN VKBD.KNOWN-KEYBOARDS WHEN (EQ CONFIGURATIONNAME (FETCH (VIRTUALKEYBOARD

                                                                                       KEYBOARDCONFIGURATION
                                                                                       )
                                                                                OF KB))
                          UNLESS (EQ 'DEFAULT (FETCH (VIRTUALKEYBOARD KEYBOARDNAME) OF KB))
                          DO (PRINT KB STREAM RDTBL))
                ELSE                                             ; Don't print DEFAULT keyboards, since they are reconstructed
                                                                 ; from configuration
                      (FOR KB IN VKBD.KNOWN-KEYBOARDS UNLESS (EQ 'DEFAULT (FETCH (VIRTUALKEYBOARD
                                                                                   KEYBOARDNAME)
                                                                             OF KB))
                          DO (PRINT KB STREAM RDTBL))))
            (PROMPTPRINT (CONCAT "Current known keyboards are stored in " FILENAME))
            (FULLNAME STREAM))))
```

)

(DEFINEQ

(**SWITCHKEYBOARDS**
```
  (LAMBDA (SWITCH-FLG DISPLAY-FLG PROCESS NEW-KEYBOARD DISPLAY-POSITION)
                                                                 ; Edited 27-Feb-96 12:35 by rmk
                                                                 ; Edited 15-Dec-87 16:32 by Snow
```

;;; This is the main function of the package. SWITCH-FLG and DISPLAY-FLG will produce the 3 logical combinations of switching a keyboard. The 4th
;;; comb NIl & NIL is NOOP. Any change of the KEYACTION handeling should be reflected here.

```
    (PROG (WINDOW)
         (COND
            ((NULL NEW-KEYBOARD)
             (SETQ NEW-KEYBOARD (VKBD.POP-UP-KEYBOARDS-MENU))))
         (COND
            ((LITATOM NEW-KEYBOARD)
             (SETQ NEW-KEYBOARD (FINDVIRTUALKEYBOARD NEW-KEYBOARD))))
         (COND
            ((NULL NEW-KEYBOARD)
             (RETURN NIL)))
         (COND
            (SWITCH-FLG (PROCESS.KEYBOARD PROCESS NEW-KEYBOARD)))
         (COND
            (DISPLAY-FLG (VKBD.COMPLETE-KEYBOARD NEW-KEYBOARD)

                  ;; This is necessary to enable the menu to generate the right characters for the keys that are defaulted

                  ;; (RETURN OLD-KEYACTIONS)

                  (SETQ WINDOW (VKBD.CREATE-KEYBOARD-DISPLAY NEW-KEYBOARD DISPLAY-POSITION
                                     (FUNCTION VKBD.SEND-CHARACTER)))))))))
```

(**VKBD.POP-MENU-AND-SWITCH-KEYBOARDS**
```
  (LAMBDA (PROCESS SWITCH-FLG DISPLAY-FLG)                      ; Edited 15-Dec-87 16:48 by Snow
    (PROG (KEYBOARD)
         (SETQ KEYBOARD (VKBD.POP-UP-KEYBOARDS-MENU "Select an alternative keyboard"))
         (|if| KEYBOARD
             |then| (SWITCHKEYBOARDS KEYBOARD SWITCH-FLG DISPLAY-FLG)))))
```

(**VKBD.POP-UP-KEYBOARDS-MENU**
```
  (LAMBDA (PROMPT-STRING)                                              ; Edited 27-Feb-96 13:22 by rmk
                                                                       ; Edited 16-Jun-92 11:35 by kaplan

     (COND
        (PROMPT-STRING (PROMPTPRINT PROMPT-STRING)
              (FLASHWINDOW PROMPTWINDOW 1)))
     (LET ((KEYBOARDTYPES '(NIL ,(KEYBOARDTYPE)
                               ,@(CDR (ASSOC (KEYBOARDTYPE)
                                             KEYBOARDCONFIGCOERCIONS))
                               ,DEFAULTVIRTUALKEYBOARDTYPE)))
          (MENU (CREATE MENU
                     ITEMS _ (CONS '(|Quit| NIL)
                                 (SORT (FOR K IN VKBD.KNOWN-KEYBOARDS
                                           WHEN (MEMB (FETCH KEYBOARDCONFIGURATION OF K)
                                                      KEYBOARDTYPES)
                                           UNLESS (MEMB (FETCH KEYBOARDNAME OF K)
                                                        $$VAL)
                                           COLLECT (FETCH KEYBOARDNAME OF K))
                                       (FUNCTION UALPHORDER)))
                     MENUFONT _ BIGFONT)))))
```

(**VKBD.GET-CONFIGURATION**
```
  (LAMBDA (CONFNAME/WINDOW)                                            ; Edited 27-Feb-96 11:13 by rmk

     ;; NIL means use the CURRENTKEYBOARDCONFIG, if it exists

     (COND
        ((WINDOWP CONFNAME/WINDOW)
         (SETQ CONFNAME/WINDOW (|fetch| (VIRTUALKEYBOARD KEYBOARDCONFIGURATION) |of| (WINDOWPROP CONFNAME/WINDOW
                                                                                       'VKBD.KEYBOARD)))))
     (COND
        ((AND CONFNAME/WINDOW (|type?| KEYBOARDCONFIGURATION CONFNAME/WINDOW))
         CONFNAME/WINDOW)
        ((AND (NULL CONFNAME/WINDOW)
              CURRENTKEYBOARDCONFIG))
        ((FASSOC (OR CONFNAME/WINDOW VKBD.DEFAULT-CONFIGURATION-NAME (KEYBOARDTYPE))
              VKBD.CONFIGURATIONS))
        (T (FOR C IN (CDR (ASSOC CONFNAME/WINDOW KEYBOARDCONFIGCOERCIONS)) WHEN (SETQ C (FASSOC C
                                                                                            VKBD.CONFIGURATIONS
                                                                                            ))
              DO (RETURN C))))))
```

(**VKBD.SUBCONFIGURATION**
```
  (LAMBDA (FULL NEWNAME LOWERLEFTKEY UPPERRIGHTKEY SCALE MARGIN) ; Edited  8-Oct-96 12:28 by rmk:

     ;; Returns a sub-configuration of FULL, including only keys that lie completely within the region enclosed by the bounding box of LOWERLEFTKEY
     ;; and UPPERRIGHTKEY.  Translates regions so that origin is the lower-left corner of the lower-left key.

     (SETQ FULL (VKBD.GET-CONFIGURATION FULL))
     (CL:UNLESS MARGIN (SETQ MARGIN 0))
     (LET (NEWREGIONS (LEFT 65535)
                (BOTTOM 65535)
                (TOP 0)
                (RIGHT 0))
          (CL:UNLESS NEWNAME
              (SETQ NEWNAME (FETCH CONFIGURATIONNAME OF FULL)))
          (FOR R IN (OR (CDR (VKBD.KEY-ASSOC LOWERLEFTKEY (FETCH KEYREGIONS OF FULL)
                                     FULL))
                        (ERROR "KEY HAS NO REGION" LOWERLEFTKEY))
             DO (CL:WHEN (ILESSP (FETCH LEFT OF R)
                             LEFT)
                    (SETQ LEFT (FETCH LEFT OF R)))
                (CL:WHEN (ILESSP (FETCH BOTTOM OF R)
                             BOTTOM)
                    (SETQ BOTTOM (FETCH BOTTOM OF R))))
          (FOR R IN (OR (CDR (VKBD.KEY-ASSOC UPPERRIGHTKEY (FETCH KEYREGIONS OF FULL)
                                     FULL))
                        (ERROR "KEY HAS NO REGION" UPPERRIGHTKEY))
             DO (CL:WHEN (IGREATERP (FETCH RIGHT OF R)
                             RIGHT)
                    (SETQ RIGHT (FETCH RIGHT OF R)))
                (CL:WHEN (IGREATERP (FETCH TOP OF R)
                             TOP)
                    (SETQ TOP (FETCH TOP OF R))))
          (SETQ NEWREGIONS
           (FOR KR IN (FETCH KEYREGIONS OF FULL) WHEN (FOR R IN (CDR KR)
                                                         ALWAYS (AND (IGEQ (FETCH LEFT OF R)
                                                                         LEFT)
                                                                     (IGEQ (FETCH BOTTOM OF R)
                                                                         BOTTOM)
                                                                     (ILEQ (FETCH TOP OF R)
                                                                         TOP)
                                                                     (ILEQ (FETCH RIGHT OF R)
                                                                         RIGHT)))
              COLLECT (CONS (CAR KR)
                          (FOR R IN (CDR KR)
                             COLLECT (IF SCALE
```

```
                                    THEN (CREATE REGION
                                                LEFT _ (FIXR (TIMES SCALE
                                                                    (+ MARGIN
                                                                       (- (FETCH LEFT OF R)
                                                                          LEFT))))
                                                BOTTOM _
                                                (FIXR (TIMES SCALE (+ MARGIN
                                                                      (- (FETCH BOTTOM OF R)
                                                                         BOTTOM))))
                                                WIDTH _ (FIXR (TIMES SCALE (FETCH WIDTH OF R)))
                                                HEIGHT _ (FIXR (TIMES SCALE (FETCH HEIGHT OF R))))
                                    ELSE (CREATE REGION USING R LEFT _
                                                        (+ MARGIN (- (FETCH LEFT OF R)
                                                                     LEFT))
                                                  BOTTOM _
                                                  (+ MARGIN (- (FETCH BOTTOM OF R)
                                                               BOTTOM))))))))
              (CREATE KEYBOARDCONFIGURATION COPYING FULL CONFIGURATIONNAME _ NEWNAME KEYREGIONS _ NEWREGIONS
                                    DEFAULTASSIGNMENT _ (FOR A IN (FETCH DEFAULTASSIGNMENT
                                                                    OF FULL)
                                                         WHEN (VKBD.KEY-ASSOC (CAR A)
                                                                 NEWREGIONS FULL)
                                                         COLLECT (COPY A))))))
)

(DEFINEQ
```

(**VKBD.BUTTONEVENTFN**
```
  (LAMBDA (WINDOW)                                                          ; Edited 15-Dec-87 16:32 by Snow
```

```
;;; This is a general 'menu' function for the keyboard when used as a menu --- it is used for all such uses: When displaying a virtual keyboard, when
;;; editing one and when editing a default assignments for a configuration.  The only difference is what will be the action taken when a KEY was selected.
;;; This will be determined by the property VKBD.MENUFN which specify the name of the function that should be called.  This function will get 3
;;; arguments : The KEYID, the WINDOW and the mouse key;  In the regular keyboard display this function will send a character to the system buffer.  In
;;; the Editor it will make the key the CURRENT key.  In the configuration info window it will display information about the key
```

```
    (PROG (MOUSE-POSITION SHADED-KEY LAST-MOUSE-KEY CURRENT-KEY-AND-REGIONS SHIFT-IS-DOWN)
          (SETQ MOUSE-POSITION (CURSORPOSITION NIL WINDOW))
          (TOTOPW WINDOW)                                                   ; This should be checked if changes to the keyboard handling is
                                                                            ; done
          (SETQ SHIFT-IS-DOWN (OR (KEYDOWNP 'RSHIFT)
                                  (KEYDOWNP 'LSHIFT)))
          (SETQ SHADED-KEY (WINDOWPROP WINDOW 'VKBD.SHADED-KEY))
          (SETQ LAST-MOUSE-KEY (WINDOWPROP WINDOW 'VKBD.MOUSE-BUTTON))
          (SETQ CURRENT-KEY-AND-REGIONS (VKBD.GET-KEY-AND-REGIONS-OF-CURSOR-POSITION MOUSE-POSITION WINDOW))
          (COND
             ((MOUSESTATE UP)
              (COND
                 ((AND SHADED-KEY (EQ SHADED-KEY (CAR CURRENT-KEY-AND-REGIONS)))
                  (APPLY (WINDOWPROP WINDOW 'VKBD.MENUFN)
                         (LIST (WINDOWPROP WINDOW 'VKBD.SHADED-KEY)
                               WINDOW
                               (WINDOWPROP WINDOW 'VKBD.LAST-MOUSE-STATE)))
                  (VKBD.RESET-KEYBOARD-WINDOW WINDOW))))
             ((OR (MOUSESTATE (ONLY LEFT))
                  (MOUSESTATE (ONLY MIDDLE)))
              (WINDOWPROP WINDOW 'VKBD.SHADED-KEY (CAR CURRENT-KEY-AND-REGIONS))
              (|for| REGION |in| (CDR CURRENT-KEY-AND-REGIONS) |do| (VKBD.INVERT-REGION REGION WINDOW))
              (WINDOWPROP WINDOW 'VKBD.LAST-MOUSE-STATE (COND
                                                          ((LASTMOUSESTATE (ONLY LEFT))
                                                           'LEFT)
                                                          (T 'MIDDLE)))
              (COND
                 ((OR SHIFT-IS-DOWN (LASTMOUSESTATE (ONLY MIDDLE)))
                  (VKBD.INVERT-SHIFT-KEYS WINDOW)
                  (WINDOWPROP WINDOW 'VKBD.SHIFT-DOWN T)))))))))
```

(**VKBD.CENTER-BITMAP-IN-REGION**
```
  (LAMBDA (BM REGION WINDOW ALLIGNMENT)                             ; Edited 15-Dec-87 16:32 by Snow
    (BITBLT BM 0 0 WINDOW (IPLUS (|fetch| (REGION LEFT) |of| REGION)
                                 (IQUOTIENT (IDIFFERENCE (|fetch| (REGION WIDTH) |of| REGION)
                                                         (BITMAPWIDTH BM))
                                            2))
            (COND
               ((GREATERP (BITMAPHEIGHT BM)
                          (|fetch| (REGION HEIGHT) |of| REGION))
                (COND
                   ((EQ ALLIGNMENT 'TOP)
                    (IDIFFERENCE (|fetch| (REGION BOTTOM) |of| REGION)
                                 (IDIFFERENCE (BITMAPHEIGHT BM)
                                              (|fetch| (REGION HEIGHT) |of| REGION))))
                   ((EQ ALLIGNMENT 'BOTTOM)
                    (|fetch| (REGION BOTTOM) |of| REGION))
                   (T (IPLUS (|fetch| (REGION BOTTOM) |of| REGION)
                             (IQUOTIENT (IDIFFERENCE (|fetch| (REGION HEIGHT) |of| REGION)
```

```
                                                     (BITMAPHEIGHT BM))
                                  2)))))
              (T (IPLUS (|fetch| (REGION BOTTOM) |of| REGION)
                        (IQUOTIENT (IDIFFERENCE (|fetch| (REGION HEIGHT) |of| REGION)
                                        (BITMAPHEIGHT BM))
                                  2))))
          NIL NIL 'INPUT 'PAINT)))
```

(**VKBD.CLEAR-KEY-DISPLAY**
```
  (LAMBDA (KEY-REGIONS VKBD-WINDOW)                              ; Edited 27-Feb-96 13:50 by rmk
    (FOR REGION LEFT BOTTOM WIDTH HEIGHT IN KEY-REGIONS
       DO (SETQ LEFT (FETCH (REGION LEFT) OF REGION))
          (SETQ BOTTOM (FETCH (REGION BOTTOM) OF REGION))
          (SETQ WIDTH (FETCH (REGION WIDTH) OF REGION))
          (SETQ HEIGHT (FETCH (REGION HEIGHT) OF REGION))
          (BITBLT NIL NIL NIL VKBD-WINDOW (ADD1 LEFT)
                  (ADD1 BOTTOM)
                  (IDIFFERENCE WIDTH 2)
                  (IDIFFERENCE HEIGHT 2)
                  'TEXTURE
                  'REPLACE WHITESHADE)
          (BITMAPBIT VKBD-WINDOW (ADD1 LEFT)
                  (ADD1 BOTTOM)
                  (ITIMES (BITMAPBIT VKBD-WINDOW (ADD1 LEFT)
                                BOTTOM)
                          (BITMAPBIT VKBD-WINDOW LEFT (ADD1 BOTTOM))))
          (BITMAPBIT VKBD-WINDOW (IPLUS LEFT (IDIFFERENCE WIDTH 2))
                  (ADD1 BOTTOM)
                  (ITIMES (BITMAPBIT VKBD-WINDOW (IPLUS LEFT (IDIFFERENCE WIDTH 2))
                                BOTTOM)
                          (BITMAPBIT VKBD-WINDOW (IPLUS LEFT (SUB1 WIDTH))
                                (ADD1 BOTTOM))))
          (BITMAPBIT VKBD-WINDOW (ADD1 LEFT)
                  (IPLUS BOTTOM (IDIFFERENCE HEIGHT 2))
                  (ITIMES (BITMAPBIT VKBD-WINDOW (ADD1 LEFT)
                                (IPLUS BOTTOM (ADD1 HEIGHT)))
                          (BITMAPBIT VKBD-WINDOW LEFT (IPLUS BOTTOM (IDIFFERENCE HEIGHT 2)))))
          (BITMAPBIT VKBD-WINDOW (IPLUS LEFT (IDIFFERENCE WIDTH 2))
                  (IPLUS BOTTOM (IDIFFERENCE HEIGHT 2))
                  (ITIMES (BITMAPBIT VKBD-WINDOW (IPLUS LEFT (SUB1 WIDTH))
                                (IPLUS BOTTOM (IDIFFERENCE HEIGHT 2)))
                          (BITMAPBIT VKBD-WINDOW (IPLUS LEFT (IDIFFERENCE WIDTH 2))
                                (IPLUS BOTTOM (SUB1 HEIGHT))))))))))
```

(**VKBD.CREATE-KEYBOARD-BITMAP**
```
  (LAMBDA (CONFIGURATION)                                        ; Edited 17-Jan-96 13:45 by rmk
                                                                 ; Edited 15-Dec-87 16:35 by Snow
    (LET (BM KEYS-REGION BM-WIDTH BM-HEIGHT MAX-REGION)
        (COND
           ((ATOM CONFIGURATION)
            (SETQ CONFIGURATION (VKBD.GET-CONFIGURATION CONFIGURATION))))
        (SETQ MAX-REGION (VKBD.UNION-REGIONS CONFIGURATION))
        (SETQ BM-WIDTH (IPLUS (ITIMES 2 (FETCH (REGION LEFT) OF MAX-REGION))
                              (FETCH (REGION WIDTH) OF MAX-REGION)))
        (SETQ BM-HEIGHT (IPLUS (ITIMES 2 (FETCH (REGION BOTTOM) OF MAX-REGION))
                               (FETCH (REGION HEIGHT) OF MAX-REGION)))
        (SETQ BM (BITMAPCREATE BM-WIDTH BM-HEIGHT))
        (BITBLT NIL NIL NIL BM 0 0 BM-WIDTH BM-HEIGHT 'TEXTURE 'REPLACE BLACKSHADE)
        (BITBLT NIL NIL NIL BM 1 1 (IDIFFERENCE BM-WIDTH 2)
                (IDIFFERENCE BM-HEIGHT 2)
                'TEXTURE
                'REPLACE
                (FETCH (KEYBOARDCONFIGURATION BACKGROUNDSHADE) OF CONFIGURATION))
        (FOR KEY-AND-REGIONS IN (FETCH (KEYBOARDCONFIGURATION KEYREGIONS) OF CONFIGURATION)
           DO ;; CDR cause odd-shaped keys (like ENTER) are described by multiple regions

                (VKBD.DISPLAY-EMPTY-KEY-CAP (CDR KEY-AND-REGIONS)
                        BM))
        BM)))
```

(**VKBD.CREATE-KEYBOARD-DISPLAY**
```
  (LAMBDA (KEYBOARD MENU-POSITION MENU-FUNCTION BM SHOWCONFIG)  ; Edited 28-Feb-96 12:02 by rmk
                                                                 ; Edited 25-May-95 11:33 by rmk:
                                                                 ; Edited 20-Apr-89 13:26 by atm
    (LET (WINDOW WINDOW-WIDTH WINDOW-HEIGHT KEYBOARD-BITMAP CONFIGURATION)
        (SETQ CONFIGURATION (VKBD.GET-CONFIGURATION (|fetch| KEYBOARDCONFIGURATION |of| KEYBOARD)))
        (SETQ KEYBOARD-BITMAP (OR BM (VKBD.CREATE-KEYBOARD-BITMAP CONFIGURATION)))
        (SETQ WINDOW-WIDTH (IPLUS 8 (BITMAPWIDTH KEYBOARD-BITMAP)))
        (SETQ WINDOW-HEIGHT (IPLUS 18 (BITMAPHEIGHT KEYBOARD-BITMAP)))
        (CL:UNLESS MENU-POSITION
            (SETQ MENU-POSITION (GETBOXPOSITION WINDOW-WIDTH WINDOW-HEIGHT)))
        (SETQ WINDOW (CREATEW (CREATEREGION (|fetch| (POSITION XCOORD) |of| MENU-POSITION)
                                (|fetch| (POSITION YCOORD) |of| MENU-POSITION)
                                WINDOW-WIDTH WINDOW-HEIGHT)
```

```
                              (CONCAT "Virtual Keyboard : " (|fetch| (VIRTUALKEYBOARD KEYBOARDNAME) |of| KEYBOARD)
                                      (CL:IF SHOWCONFIG
                                             (CONCAT " for " (|fetch| (VIRTUALKEYBOARD KEYBOARDCONFIGURATION)
                                                                      |of| KEYBOARD))
                                       ""))))
                 (WINDOWPROP WINDOW 'VKBD.KEYBOARD KEYBOARD)
                 (WINDOWPROP WINDOW 'BUTTONEVENTFN (FUNCTION VKBD.BUTTONEVENTFN))
                 (WINDOWPROP WINDOW 'CURSORMOVEDFN (FUNCTION VKBD.CURSORMOVEDFN))
                 (WINDOWPROP WINDOW 'CURSOROUTFN (FUNCTION VKBD.RESET-KEYBOARD-WINDOW))
                 (WINDOWPROP WINDOW 'CURSORINFN (FUNCTION VKBD.RESET-KEYBOARD-WINDOW))
                 (WINDOWPROP WINDOW 'VKBD.MENUFN MENU-FUNCTION)
                 (WINDOWPROP WINDOW 'REPAINTFN (FUNCTION VKBD.KEYBOARD-WINDOW-REPAINTFN))
                 (WINDOWPROP WINDOW 'RESHAPEFN (FUNCTION RESHAPEBYREPAINTFN))
                 (WINDOWPROP WINDOW 'SCROLLFN (FUNCTION SCROLLBYREPAINTFN))
                 (WINDOWPROP WINDOW 'EXTENT (CREATEREGION 0 0 (BITMAPWIDTH KEYBOARD-BITMAP)
                                                         (BITMAPHEIGHT KEYBOARD-BITMAP)))
                 (WINDOWPROP WINDOW 'ICONFN (FUNCTION VKBD.ICONFN))
                 (WINDOWPROP WINDOW 'VKBD.KEYBOARDDISPLAYFONT (OR (|fetch| (VIRTUALKEYBOARD KEYBOARDDISPLAYFONT)
                                                                         |of| KEYBOARD)
                                                                DEFAULTKEYBOARDDISPLAYFONT))
                 (REDISPLAYW WINDOW)
                 WINDOW)))
```

(VKBD.CURSORMOVEDFN

```
  (LAMBDA (WINDOW)                                                          ; Edited 15-Dec-87 16:41 by Snow
    (PROG (MOUSE-POSITION SHADED-KEY CURRENT-KEY-AND-REGIONS SHIFT-IS-DOWN)
          (SETQ MOUSE-POSITION (CURSORPOSITION NIL WINDOW))
          (SETQ SHADED-KEY (WINDOWPROP WINDOW 'VKBD.SHADED-KEY))
          (SETQ SHIFT-IS-DOWN (OR (KEYDOWNP 'LSHIFT)
                                  (KEYDOWNP 'RSHIFT)))
          (COND
            (SHADED-KEY (COND
                          ((NOT (VKBD.POSITION-IS-IN-KEY-REGION SHADED-KEY MOUSE-POSITION WINDOW))
                           (VKBD.RESET-KEYBOARD-WINDOW WINDOW))
                          (T (RETURN T)))))
          (COND
            ((MOUSESTATE (OR (ONLY LEFT)
                             (ONLY MIDDLE)))
             (SETQ CURRENT-KEY-AND-REGIONS (VKBD.GET-KEY-AND-REGIONS-OF-CURSOR-POSITION MOUSE-POSITION WINDOW)
             )
             (COND
               (CURRENT-KEY-AND-REGIONS (|for| REGION |in| (CDR CURRENT-KEY-AND-REGIONS)
                                              |do| (VKBD.INVERT-REGION REGION WINDOW))
                       (COND
                         ((OR SHIFT-IS-DOWN (LASTMOUSESTATE (ONLY MIDDLE)))
                          (VKBD.INVERT-SHIFT-KEYS WINDOW)
                          (WINDOWPROP WINDOW 'VKBD.SHIFT-DOWN T)))
                       (WINDOWPROP WINDOW 'VKBD.SHADED-KEY (CAR CURRENT-KEY-AND-REGIONS))
                       (WINDOWPROP WINDOW 'VKBD.LAST-MOUSE-STATE (COND
                                                                   ((LASTMOUSESTATE (ONLY LEFT))
                                                                    'LEFT)
                                                                   (T 'MIDDLE)))))))))
```

(VKBD.DISPLAY-CHARACTER

```
  (LAMBDA (CHAR REGION CHARLABELS WINDOW CONF ALLIGNMENT)      ; Edited  7-Mar-96 02:14 by rmk
                                                               ; Edited 17-Feb-95 12:58 by rmk:
    (LET (CHARLABEL)
         (SETQ REGION (VKBD.EXTEND-REGION REGION -1))
         (COND
           ((SETQ CHARLABEL (CADR (OR (FASSOC CHAR CHARLABELS)
                                      (FASSOC CHAR VKBD.COMMONCODELABELS))))
            (DSPFONT (OR (|fetch| (KEYBOARDCONFIGURATION KEYLABELSFONT) |of| CONF)
                         DEFAULTKEYBOARDLABELSFONT)
                     WINDOW)
            (CENTERPRINTINREGION CHARLABEL REGION WINDOW))
           (T (VKBD.CENTER-BITMAP-IN-REGION (GETCHARBITMAP CHAR (FONTCREATE (OR (WINDOWPROP WINDOW
                                                                                           '
                                                                                VKBD.KEYBOARDDISPLAYFONT
                                                                                )
                                                                               (|fetch| (KEYBOARDCONFIGURATION
                                                                                         KEYBOARDDISPLAYFONT)
                                                                                      |of| CONF)
                                                                               DEFAULTKEYBOARDDISPLAYFONT)))
                       REGION WINDOW ALLIGNMENT))))))
```

(VKBD.DISPLAY-EMPTY-KEY-CAP

```
  (LAMBDA (KEY-REGIONS BM)                                     ; Edited 27-Feb-96 13:32 by rmk
    (LET (LEFT BOTTOM WIDTH HEIGHT)
         (FOR REGION IN KEY-REGIONS DO (SETQ LEFT (FETCH (REGION LEFT) OF REGION))
                                       (SETQ BOTTOM (FETCH (REGION BOTTOM) OF REGION))
                                       (SETQ WIDTH (FETCH (REGION WIDTH) OF REGION))
                                       (SETQ HEIGHT (FETCH (REGION HEIGHT) OF REGION))
                                       (BITBLT NIL NIL NIL BM LEFT BOTTOM WIDTH HEIGHT 'TEXTURE 'REPLACE
                                               BLACKSHADE)
```

```
                                    (BITBLT NIL NIL NIL BM (ADD1 LEFT)
                                           (ADD1 BOTTOM)
                                           (IDIFFERENCE WIDTH 2)
                                           (IDIFFERENCE HEIGHT 2)
                                           'TEXTURE
                                           'REPLACE WHITESHADE)
                                    (BITMAPBIT BM LEFT BOTTOM 0)
                                    (BITMAPBIT BM (IPLUS LEFT (SUB1 WIDTH))
                                           BOTTOM 0)
                                    (BITMAPBIT BM LEFT (IPLUS BOTTOM (SUB1 HEIGHT))
                                           0)
                                    (BITMAPBIT BM (IPLUS LEFT (SUB1 WIDTH))
                                           (IPLUS BOTTOM (SUB1 HEIGHT))
                                           0))
            (COND
               ((CDR KEY-REGIONS)
                (FOR REGION1 IN KEY-REGIONS
                   DO (FOR REGION2 IN KEY-REGIONS BIND INTERSECT
                         DO (COND
                               ((NOT (EQUAL REGION1 REGION2))
                                (SETQ INTERSECT (INTERSECTREGIONS (CREATEREGION (SUB1 (FETCH (REGION LEFT)
                                                                                           OF REGION1))
                                                                         (SUB1 (FETCH (REGION BOTTOM)
                                                                                    OF REGION1))
                                                                         (IPLUS (FETCH (REGION WIDTH)
                                                                                       OF REGION1)
                                                                                2)
                                                                         (IPLUS (FETCH (REGION HEIGHT)
                                                                                       OF REGION1)
                                                                                2))
                                                         (CREATEREGION (SUB1 (FETCH (REGION LEFT) OF REGION2))
                                                                (SUB1 (FETCH (REGION BOTTOM) OF REGION2))
                                                                (IPLUS (FETCH (REGION WIDTH) OF REGION2)
                                                                       2)
                                                                (IPLUS (FETCH (REGION HEIGHT) OF REGION2)
                                                                       2))))
                                (COND
                                   (INTERSECT (COND
                                                 ((GREATERP (FETCH (REGION HEIGHT) OF INTERSECT)
                                                         (FETCH (REGION WIDTH) OF INTERSECT))
                                                  (SETQ INTERSECT (CREATEREGION (FETCH (REGION LEFT) OF INTERSECT
                                                                                       )
                                                                         (ADD1 (FETCH (REGION BOTTOM)
                                                                                      OF INTERSECT))
                                                                         (FETCH (REGION WIDTH) OF INTERSECT)
                                                                         (IDIFFERENCE (FETCH (REGION HEIGHT)
                                                                                             OF INTERSECT)
                                                                                2)))
                                                  (BITBLT NIL NIL NIL BM (FETCH (REGION LEFT) OF INTERSECT)
                                                         (FETCH (REGION BOTTOM) OF INTERSECT)
                                                         (FETCH (REGION WIDTH) OF INTERSECT)
                                                         (FETCH (REGION HEIGHT) OF INTERSECT)
                                                         'TEXTURE
                                                         'REPLACE BLACKSHADE)
                                                  (BITBLT NIL NIL NIL BM (FETCH (REGION LEFT) OF INTERSECT)
                                                         (ADD1 (FETCH (REGION BOTTOM) OF INTERSECT))
                                                         (FETCH (REGION WIDTH) OF INTERSECT)
                                                         (IDIFFERENCE (FETCH (REGION HEIGHT) OF INTERSECT)
                                                                2)
                                                         'TEXTURE
                                                         'REPLACE WHITESHADE))
                                                 (T (SETQ INTERSECT (CREATEREGION (ADD1 (FETCH (REGION LEFT)
                                                                                               OF INTERSECT))
                                                                           (FETCH (REGION BOTTOM) OF INTERSECT)
                                                                           (IDIFFERENCE (FETCH (REGION WIDTH)
                                                                                               OF INTERSECT)
                                                                                  2)
                                                                           (FETCH (REGION HEIGHT) OF INTERSECT)))
                                                    (BITBLT NIL NIL NIL BM (FETCH (REGION LEFT) OF INTERSECT)
                                                           (FETCH (REGION BOTTOM) OF INTERSECT)
                                                           (FETCH (REGION WIDTH) OF INTERSECT)
                                                           (FETCH (REGION HEIGHT) OF INTERSECT)
                                                           'TEXTURE
                                                           'REPLACE BLACKSHADE)
                                                    (BITBLT NIL NIL NIL BM (ADD1 (FETCH (REGION LEFT)
                                                                                        OF INTERSECT))
                                                           (FETCH (REGION BOTTOM) OF INTERSECT)
                                                           (IDIFFERENCE (FETCH (REGION WIDTH) OF INTERSECT)
                                                                  2)
                                                           (FETCH (REGION HEIGHT) OF INTERSECT)
                                                           'TEXTURE
                                                           'REPLACE WHITESHADE)))))))))))))))
```

(**VKBD.DISPLAY-KEY**
  (LAMBDA (KEYID WINDOW CONFIG KEYLABELS CHARLABELS KEYREGIONS)   ; Edited 7-Mar-96 01:53 by rmk
                                                                  ; Edited 15-Dec-87 17:40 by Snow

```
        (SETQ KEYID (VKBD.TRANSLATE-KEY-ID KEYID CONFIG))
    (LET (KEY-ASSIGNMENT LABEL-STRING KEYREGIONS)
         (CL:WHEN (OR KEYREGIONS (SETQ KEYREGIONS (CDR (VKBD.KEY-ASSOC KEYID (FETCH (KEYBOARDCONFIGURATION
                                                                                          KEYREGIONS)
                                                                             OF CONFIG)))))
```
;; If the REGION doesn't exist, we can't display it. E.g., our picture doesn't include the F1 keys. CAR because some keys (e.g. for
;; ENTER) are defined by two rectangles
```
             (VKBD.CLEAR-KEY-DISPLAY KEYREGIONS WINDOW)
             (SETQ KEYLABELS (OR KEYLABELS (FETCH (KEYBOARDCONFIGURATION KEYLABELS) OF CONFIG)))
             (COND
                ((SETQ LABEL-STRING (CADR (VKBD.KEY-ASSOC KEYID KEYLABELS CONFIG))))
                (T (SETQ KEY-ASSIGNMENT (VKBD.KEY-ASSOC KEYID (FETCH (VIRTUALKEYBOARD COMPLETEKEYASSIGNMENTS)
                                                                OF (WINDOWPROP WINDOW 'VKBD.KEYBOARD))
                                         CONFIG))
                   (SETQ LABEL-STRING (VKBD.GET-NON-CHAR-LABEL KEY-ASSIGNMENT))))
             (COND
                (LABEL-STRING (DSPFONT (OR (FETCH (KEYBOARDCONFIGURATION KEYLABELSFONT) OF CONFIG)
                                          DEFAULTKEYBOARDLABELSFONT)
                                       WINDOW)
                      (COND
                         ((AND (LISTP LABEL-STRING)
                               (CDR LABEL-STRING))
                          (CENTERPRINTINREGION (CAR LABEL-STRING)
                                 (VKBD.UPPER-HALF-REGION (CAR KEYREGIONS))
                                        WINDOW)
                          (CENTERPRINTINREGION (CADR LABEL-STRING)
                                 (VKBD.LOWER-HALF-REGION (CAR KEYREGIONS))
                                        WINDOW))
                         (T (CENTERPRINTINREGION LABEL-STRING (CAR KEYREGIONS)
                                   WINDOW))))
                (T (VKBD.DISPLAY-KEY-CHARACTERS KEY-ASSIGNMENT (CAR KEYREGIONS)
                         WINDOW CONFIG CHARLABELS)))))))))
```

(**VKBD.DISPLAY-KEY-CHARACTERS**
```
    (LAMBDA (KEY-ASSIGNMENT KEY-REGION WINDOW CONFIG CHARLABELS)      ; Edited  7-Mar-96 01:15 by rmk
      (LET (SHIFTED-CHAR UNSHIFTED-CHAR)
           (COND
              ((AND KEY-ASSIGNMENT (LISTP (CADR KEY-ASSIGNMENT)))
               (CL:WHEN KEY-REGION
                   (SETQ SHIFTED-CHAR (VKBD.SHIFTED-CHAR KEY-ASSIGNMENT))
                   (SETQ UNSHIFTED-CHAR (VKBD.UNSHIFTED-CHAR KEY-ASSIGNMENT))
                   (COND
                      ((EQ SHIFTED-CHAR UNSHIFTED-CHAR)
                       (VKBD.DISPLAY-CHARACTER SHIFTED-CHAR KEY-REGION CHARLABELS WINDOW CONFIG))
                      (T (VKBD.DISPLAY-CHARACTER UNSHIFTED-CHAR (VKBD.LOWER-HALF-REGION KEY-REGION)
                               CHARLABELS WINDOW CONFIG 'BOTTOM)
                         (VKBD.DISPLAY-CHARACTER SHIFTED-CHAR (VKBD.UPPER-HALF-REGION KEY-REGION)
                               CHARLABELS WINDOW CONFIG 'TOP)))))))))
```

(**VKBD.DRAW-KEY-CAPS**
```
    (LAMBDA (LIST-OF-REGIONS BITMAP)                                      ; Edited 13-Jun-90 01:10 by mitani
      (|for| REGION |in| LIST-OF-REGIONS |do| (BITBLT NIL NIL NIL BITMAP (|fetch| (REGION LEFT) |of| REGION)
                                                 (|fetch| (REGION BOTTOM) |of| REGION)
                                                 (|fetch| (REGION WIDTH) |of| REGION)
                                                 (|fetch| (REGION HEIGHT) |of| REGION)
                                                 'TEXTURE
                                                 'REPLACE BLACKSHADE)
                                          (BITBLT NIL NIL NIL BITMAP (ADD1 (|fetch| (REGION LEFT) |of| REGION))
                                                 (ADD1 (|fetch| (REGION BOTTOM) |of| REGION))
                                                 (IDIFFERENCE (|fetch| (REGION WIDTH) |of| REGION)
                                                        2)
                                                 (IDIFFERENCE (|fetch| (REGION HEIGHT) |of| REGION)
                                                        2)
                                                 'TEXTURE
                                                 'REPLACE WHITESHADE)))))
```

(**VKBD.ERASE-FRAME**
```
    (LAMBDA (KEY WINDOW FRAMESIZE)                                        ; Edited 15-Dec-87 16:42 by Snow
      (VKBD.FRAME-KEY KEY WINDOW (|fetch| (KEYBOARDCONFIGURATION BACKGROUNDSHADE) |of| (VKBD.GET-CONFIGURATION
                                                                                          WINDOW))
             FRAMESIZE)))
```

(**VKBD.EXTEND-REGION**
```
    (LAMBDA (REGION NBITS)                                                ; Edited 15-Dec-87 16:42 by Snow
      (COND
         ((NULL NBITS)
          (SETQ NBITS 1)))
      (CREATEREGION (IDIFFERENCE (|fetch| (REGION LEFT) |of| REGION)
                           NBITS)
             (IDIFFERENCE (|fetch| (REGION BOTTOM) |of| REGION)
                    NBITS)
```

```
                    (IPLUS (|fetch| (REGION WIDTH) |of| REGION)
                           (ITIMES NBITS 2))
                    (IPLUS (|fetch| (REGION HEIGHT) |of| REGION)
                           (ITIMES NBITS 2)))))
```

(**VKBD.GET-KEY-AND-REGIONS-OF-CURSOR-POSITION**
```
    (LAMBDA (CURSOR-POSITION WINDOW)                          ; Edited 15-Dec-87 16:43 by Snow
      (|for| KEY-REGIONS |in| (|fetch| (KEYBOARDCONFIGURATION KEYREGIONS) |of| (VKBD.GET-CONFIGURATION WINDOW))
        |thereis| (|for| REGION |in| (CDR KEY-REGIONS) |thereis| (INSIDEP REGION CURSOR-POSITION)))))
```

(**VKBD.GET-KEY-REGIONS**
```
    (LAMBDA (KEY-ID CONFIG)                                   ; Edited 27-Feb-96 21:18 by rmk
      (CDR (VKBD.KEY-ASSOC KEY-ID (FETCH (KEYBOARDCONFIGURATION KEYREGIONS) OF CONFIG)
                 CONFIG))))
```

(**VKBD.INVERT-KEY**
```
    (LAMBDA (KEY-ID VKBD-WINDOW)                              ; Edited 27-Feb-96 21:14 by rmk
      (FOR REGION IN (VKBD.GET-KEY-REGIONS KEY-ID (VKBD.GET-CONFIGURATION VKBD-WINDOW))
         DO (VKBD.INVERT-REGION REGION VKBD-WINDOW))))
```

(**VKBD.INVERT-REGION**
```
    (LAMBDA (REGION WINDOW)                                   ; Edited 15-Dec-87 16:46 by Snow
      (|if| REGION
          |then| (BITBLT WINDOW (|fetch| (REGION LEFT) |of| REGION)
                         (|fetch| (REGION BOTTOM) |of| REGION)
                         WINDOW
                         (|fetch| (REGION LEFT) |of| REGION)
                         (|fetch| (REGION BOTTOM) |of| REGION)
                         (|fetch| (REGION WIDTH) |of| REGION)
                         (|fetch| (REGION HEIGHT) |of| REGION)
                         'INVERT
                         'REPLACE))))
```

(**VKBD.KEYBOARD-WINDOW-REPAINTFN**
```
    (LAMBDA (WINDOW)                                          ; Edited  7-Mar-96 13:38 by rmk
      (LET (BM KEYLABELS CHARLABELS (CONFIG (VKBD.GET-CONFIGURATION WINDOW))
               (KEYBOARD (WINDOWPROP WINDOW 'VKBD.KEYBOARD)))
        (SETQ KEYLABELS (FOR K IN (FETCH (KEYBOARDCONFIGURATION KEYLABELS) OF CONFIG)
                           COLLECT (LIST (VKBD.TRANSLATE-KEY-ID (CAR K)
                                                 CONFIG)
                                         (CADR K))))
```
        ;; Build this up each time, so that the keyids are specialized to this keyboard. But the internal search will be much faster.
```
        (FOR K TR IN VKBD.COMMONKEYLABELS WHEN (SETQ TR (VKBD.TRANSLATE-KEY-ID (CAR K)
                                                                 CONFIG))
            UNLESS (ASSOC TR KEYLABELS) DO (PUSH KEYLABELS (LIST TR (CADR K))))
        (SETQ CHARLABELS (FETCH (KEYBOARDCONFIGURATION CHARLABELS) OF CONFIG))
        (SETQ BM (VKBD.CREATE-KEYBOARD-BITMAP CONFIG))
        (BITBLT BM 0 0 WINDOW)
```
        ;; Display all the keys
```
        (FOR R IN (FETCH KEYREGIONS OF CONFIG) DO (VKBD.DISPLAY-KEY (VKBD.TRANSLATE-KEY-ID (CAR R)
                                                                        CONFIG)
                                                     WINDOW CONFIG KEYLABELS CHARLABELS (CDR R)))
        (COND
           ((WINDOWPROP WINDOW 'VKBD.LOCKED)
            (VKBD.INVERT-LOCK-KEYS WINDOW)))
        (WINDOWPROP WINDOW 'VKBD.SHADED-KEY NIL)
        (WINDOWPROP WINDOW 'VKBD.LAST-MOUSE-STATE NIL))))
```

(**VKBD.LOWER-HALF-REGION**
```
    (LAMBDA (REGION)                                          ; Edited 15-Dec-87 16:48 by Snow
      (CREATEREGION (|fetch| (REGION LEFT) |of| REGION)
              (|fetch| (REGION BOTTOM) |of| REGION)
              (|fetch| (REGION WIDTH) |of| REGION)
              (IQUOTIENT (|fetch| (REGION HEIGHT) |of| REGION)
                  2))))
```

(**VKBD.POSITION-IS-IN-KEY-REGION**
```
    (LAMBDA (KEY POSITION WINDOW)                             ; Edited 27-Feb-96 21:21 by rmk
      (FOR REGION IN (VKBD.GET-KEY-REGIONS KEY (VKBD.GET-CONFIGURATION WINDOW)) THEREIS (INSIDEP REGION
                                                                                          POSITION))))
```

(**VKBD.REMOVE-KEYBOARD-COMMAND**
```
    (LAMBDA NIL                                               ; Edited 15-Dec-87 16:49 by Snow
      (PROG (K)
            (SETQ K (VKBD.POP-UP-KEYBOARDS-MENU "Select keyboard to be removed ."))
            (|if| K
                |then| (VKBD.UNDEFINE-KEYBOARD K)
```

```
                                    (PRINTOUT PROMPTWINDOW "Keyboard " K " was removed from the list of known keyboards. ")))))
```

(**VKBD.UNION-REGIONS**
```
  (LAMBDA (CONFIGURATION)                                          ; Edited 17-Jan-96 13:47 by rmk

    ;; Don't let too many arguments pile up on the stack.

    (LET ((KEYREGS (FETCH KEYREGIONS OF CONFIGURATION)))
         (APPLY 'UNIONREGIONS (WHILE KEYREGS
                                COLLECT (APPLY 'UNIONREGIONS
                                              (WHILE KEYREGS FOR I VAL FROM 1 TO 50
                                               DO  ;; CDR because odd-shaped keys (e.g. ENTER) have multiple regions

                                                        (FOR R IN (CDR (POP KEYREGS))
                                                          DO  (PUSH VAL R))
                                                FINALLY (RETURN VAL))))))))))
```

(**VKBD.UPPER-HALF-REGION**
```
  (LAMBDA (REGION)                                                 (* |sm| "13-Aug-85 10:38")
    (CREATEREGION (|fetch| (REGION LEFT) |of| REGION)
           (IPLUS 1 (|fetch| (REGION BOTTOM) |of| REGION)
                  (IQUOTIENT (|fetch| (REGION HEIGHT) |of| REGION)
                        2))
           (|fetch| (REGION WIDTH) |of| REGION)
           (IQUOTIENT (|fetch| (REGION HEIGHT) |of| REGION)
                  2))))
)

(DEFINEQ
```

(**VKBD.KEY-ASSOC**
```
  (LAMBDA (KEY ALIST CONFIG)                                       ; Edited  5-Oct-96 16:59 by rmk:
                                                                   ; Edited 27-Feb-96 21:07 by rmk
    (CL:WHEN (SETQ KEY (VKBD.TRANSLATE-KEY-ID KEY CONFIG))
        (FIND C IN ALIST SUCHTHAT (EQ (VKBD.TRANSLATE-KEY-ID (CAR C)
                                              CONFIG)
                                      KEY)))))
```

(**VKBD.CHAR-ASSIGNMENTP**
```
  (LAMBDA (ASSIGNMENT)                                             ; Edited 26-Feb-96 16:49 by rmk
    (LISTP (CADR ASSIGNMENT))))
```

(**VKBD.COMPLETE-KEYBOARD**
```
  (LAMBDA (KEYBOARD)                                               ; Edited  7-Mar-96 13:25 by rmk

    ;; Fill in keys that aren't mentioned in the new keyboard, using the configuration's default.  Put the parsed results in the
    ;; COMPLETEKEYASSIGNMENTS field, for future use.  This field is not written out by the STORE-KEYBOARD function.

    (CL:UNLESS (FETCH COMPLETEKEYASSIGNMENTS OF KEYBOARD)
        (LET (COMPLETE-ASSIGNMENTS (CONFIG (VKBD.GET-CONFIGURATION (FETCH (VIRTUALKEYBOARD
                                                                                KEYBOARDCONFIGURATION)
                                                                      OF KEYBOARD))))

             ;; The assignment comes from the keyboard (PARTIAL), the configuration default,  or the common default assignments.

             (FOR K A CA IN (FETCH (VIRTUALKEYBOARD KEYASSIGNMENTS) OF KEYBOARD)
                DO (SETQ A (VKBD.PARSE-KEY-ASSIGNMENT K CONFIG))
                   (IF (NULL (SETQ CA (ASSOC (CAR A)
                                             COMPLETE-ASSIGNMENTS)))
                       THEN (PUSH COMPLETE-ASSIGNMENTS A)
                     ELSEIF (EQUAL A CA)
                       ELSE (ERROR "INCOMPATIBLE ASSIGNMENTS OF KEY NUMBER" (LIST K A CA))))
             (FOR K A IN (FETCH (KEYBOARDCONFIGURATION DEFAULTASSIGNMENT) OF CONFIG)
                DO (SETQ A (VKBD.PARSE-KEY-ASSIGNMENT K CONFIG))
                   (CL:UNLESS (ASSOC (CAR A)
                                     COMPLETE-ASSIGNMENTS)
                         (PUSH COMPLETE-ASSIGNMENTS A)))

             ;; The configs defaultassignment can override the VKBD.COMMONDEFAULTASSIGNMENT

             (FOR K A IN VKBD.COMMONDEFAULTASSIGNMENT WHEN (SETQ A (VKBD.PARSE-KEY-ASSIGNMENT K CONFIG T))
                DO (CL:UNLESS (ASSOC (CAR A)
                                     COMPLETE-ASSIGNMENTS)
                         (PUSH COMPLETE-ASSIGNMENTS A)))
             (REPLACE COMPLETEKEYASSIGNMENTS OF KEYBOARD WITH COMPLETE-ASSIGNMENTS)))
      KEYBOARD))
```

(**VKBD.CTRL-ASSIGNMENTP**
```
  (LAMBDA (ASSIGNMENT)                                             ; Edited 15-Dec-87 16:33 by Snow
    (AND (EQ (CADR ASSIGNMENT)
             'CTRLDOWN)
         (EQ (CDDR ASSIGNMENT)
             'CTRLUP))))
```

⟨**VKBD.EVENT-ASSIGNMENTP**
  (LAMBDA (ASSIGNMENT)   ; Edited 15-Dec-87 16:34 by Snow
    (AND (EQ (CADR ASSIGNMENT)
             'EVENT)
         (EQ (CDDR ASSIGNMENT)
             'EVENT))))

⟨**VKBD.META-ASSIGNMENTP**
  (LAMBDA (ASSIGNMENT)   ; Edited 15-Dec-87 16:34 by Snow
    (AND (EQ (CADR ASSIGNMENT)
             'METADOWN)
         (EQ (CDDR ASSIGNMENT)
             'METAUP))))

⟨**VKBD.FRAME-KEY**
  (LAMBDA (KEY WINDOW SHADE BITS)   ; Edited 29-Feb-96 11:06 by rmk
    (LET ((CONFIG (**VKBD.GET-CONFIGURATION** WINDOW))
           KEY-REGIONS)
         (SETQ KEY-REGIONS (**VKBD.GET-KEY-REGIONS** KEY CONFIG))
         (**FOR** REGION EXTENDED-REGION **IN** KEY-REGIONS **DO** (SETQ EXTENDED-REGION (**VKBD.EXTEND-REGION** REGION BITS))
                                                       (BITBLT NIL NIL NIL WINDOW (**FETCH** (REGION LEFT)
                                                                                        OF EXTENDED-REGION)
                                                               (**FETCH** (REGION BOTTOM) **OF** EXTENDED-REGION)
                                                               (**FETCH** (REGION WIDTH) **OF** EXTENDED-REGION)
                                                               (**FETCH** (REGION HEIGHT) **OF** EXTENDED-REGION)
                                                               'TEXTURE
                                                               'REPLACE SHADE))
         (**VKBD.DISPLAY-EMPTY-KEY-CAP** KEY-REGIONS WINDOW)
         (**VKBD.DISPLAY-KEY** KEY WINDOW CONFIG)
         (**IF** (EQ (WINDOWPROP WINDOW 'VKBD.SHADED-KEY)
                 KEY)
             THEN (**VKBD.INVERT-KEY** KEY WINDOW)))))

⟨**VKBD.GET-CURRENT-KEY-ASSIGNMENT**
  (LAMBDA (KEY WINDOW/CONFIGURATION)   ; Edited 7-Mar-96 12:33 by rmk
                                                               ; Edited 15-Dec-87 16:43 by Snow
    (CONS KEY (KEYACTION (OR (**VKBD.TRANSLATE-KEY-ID** KEY WINDOW/CONFIGURATION)
                            KEY)))))

⟨**VKBD.GET-NON-CHAR-LABEL**
  (LAMBDA (KEY-ASSIGNMENT)   ; Edited 15-Dec-87 16:44 by Snow
    (COND
       ((**VKBD.SHIFT-ASSIGNMENTP** KEY-ASSIGNMENT)
        "SHIFT")
       ((**VKBD.LOCK-ASSIGNMENTP** KEY-ASSIGNMENT)
        "LOCK")
       ((**VKBD.CTRL-ASSIGNMENTP** KEY-ASSIGNMENT)
        "CTRL")
       ((**VKBD.LOCKUP-ASSIGNMENTP** KEY-ASSIGNMENT)
        '("LOCK" "UP"))
       ((**VKBD.LOCKDOWN-ASSIGNMENTP** KEY-ASSIGNMENT)
        '("LOCK" "DOWN"))
       ((**VKBD.META-ASSIGNMENTP** KEY-ASSIGNMENT)
        "META")
       ((**VKBD.EVENT-ASSIGNMENTP** KEY-ASSIGNMENT)
        " ")
       (T NIL))))

⟨**VKBD.ICONFN**
  (LAMBDA (WINDOW ICON)   ; Edited 15-Dec-87 16:44 by Snow
    (COND
       ((NULL ICON)
        (SETQ ICON (TITLEDICONW (|**create**| TITLEDICON
                                        ICON _ VKBD.ICON
                                        MASK _ VKBD.MASK
                                        TITLEREG _ (CREATEREGION 5 15 80 50))
                               (|**fetch**| (VIRTUALKEYBOARD KEYBOARDNAME) |**of**| (WINDOWPROP WINDOW 'VKBD.KEYBOARD))
                               (FONTCREATE 'GACHA 8)))))
       ICON))

⟨**VKBD.INVERT-LOCK-KEYS**
  (LAMBDA (WINDOW)   ; Edited 26-Feb-96 17:04 by rmk
    (**FOR** KEY-ASSIGNMENT **IN** (**FETCH** (VIRTUALKEYBOARD COMPLETEKEYASSIGNMENTS) **OF** (WINDOWPROP WINDOW
                                                                                       'VKBD.KEYBOARD))
       WHEN (**VKBD.LOCK-ASSIGNMENTP** KEY-ASSIGNMENT) **DO** (**VKBD.INVERT-KEY** (CAR KEY-ASSIGNMENT)
                                                                WINDOW))))

⟨**VKBD.INVERT-SHIFT-KEYS**
  (LAMBDA (WINDOW)   ; Edited 27-Feb-96 21:13 by rmk
    (**FOR** KEY-ASSIGNMENT **IN** (**FETCH** (VIRTUALKEYBOARD COMPLETEKEYASSIGNMENTS) **OF** (WINDOWPROP WINDOW

```
                                                                        'VKBD.KEYBOARD))
        WHEN (VKBD.SHIFT-ASSIGNMENTP KEY-ASSIGNMENT) DO (VKBD.INVERT-KEY (CAR KEY-ASSIGNMENT)
                                                                         WINDOW))))
```

(**VKBD.TRANSLATE-KEY-ID**
```
  (LAMBDA (KEY-ID CONFIG)                                   ; Edited  7-Mar-96 12:28 by rmk
```
    ;; Assumes that KEY-ID's that look like key numbers ARE key numbers. Thus, integers in the range [0,\NKEYS) can't be used as ID's. Returns
    ;; NIL if the KEY-ID doesn't exist
```
    (OR (KEYNUMBERP KEY-ID)
        (LET ((NUM (CADR (ASSOC KEY-ID (FETCH KEYNAMESMAPPING OF CONFIG)))))
```
            ;; If result is not a keynumber, then try recursing. Introduces a synonym facility
```
            (OR (KEYNUMBERP NUM)
                (AND NUM (VKBD.TRANSLATE-KEY-ID NUM CONFIG)))))))
```

(**VKBD.KEY-ID-TO-KEY-NAMES**
```
  (LAMBDA (KEY-ID WINDOW/CONFIGURATION)                     ; Edited 15-Dec-87 16:46 by Snow
    (SETQ WINDOW/CONFIGURATION (VKBD.GET-CONFIGURATION WINDOW/CONFIGURATION))
    (|for| NAME-ID-PAIR |in| (|fetch| (KEYBOARDCONFIGURATION KEYNAMESMAPPING) |of| WINDOW/CONFIGURATION)
      |when| (EQ (CADR NAME-ID-PAIR)
                 KEY-ID)
      |collect| (CAR NAME-ID-PAIR))))
```

(**VKBD.KEYBOARD-IS-KEYBOARDTYPE-KEYBOARD**
```
  (LAMBDA (KEYBOARD)                                        ; Edited 24-May-95 15:25 by rmk:
```
    ;; T if this keyboard is configured for the current physical keyboardtype.
```
    (MEMB (FETCH (KEYBOARDCONFIGURATION KEYBOARDTYPE) OF (VKBD.GET-CONFIGURATION (FETCH KEYBOARDCONFIGURATION
                                                                                        OF KEYBOARD)))
          (ASSOC (KEYBOARDTYPE)
                 KEYBOARDCONFIGCOERCIONS))))
```

(**VKBD.LOCK-ASSIGNMENTP**
```
  (LAMBDA (ASSIGNMENT)                                      ; Edited 28-Feb-96 14:33 by rmk
                                                           ; Edited 15-Dec-87 16:47 by Snow
    (SELECTQ (CADR ASSIGNMENT)
        (LOCKDOWN (EQ (CDDR ASSIGNMENT)
                      'LOCKUP))
        (LOCKTOGGLE (MEMB (CDDR ASSIGNMENT)
                          '(NIL IGNORE)))
        NIL)))
```

(**VKBD.LOCK-KEYP**
```
  (LAMBDA (KEY WINDOW)                                      ; Edited 26-Feb-96 17:05 by rmk
    (VKBD.LOCK-ASSIGNMENTP (FASSOC KEY (|fetch| (VIRTUALKEYBOARD COMPLETEKEYASSIGNMENTS)
                                         |of| (WINDOWPROP WINDOW 'VKBD.KEYBOARD))))))
```

(**VKBD.LOCK/NOLOCK**
```
  (LAMBDA (KEY-ACTION)                                      ; Edited 15-Dec-87 16:47 by Snow
    (CADDR (CADR KEY-ACTION))))
```

(**VKBD.LOCKDOWN-ASSIGNMENTP**
```
  (LAMBDA (ASSIGNMENT)                                      ; Edited 15-Dec-87 16:47 by Snow
    (AND (EQ (CADR ASSIGNMENT)
             'LOCKDOWN)
         (OR (NULL (CDDR ASSIGNMENT))
             (EQ (CDDR ASSIGNMENT)
                 'IGNORE)))))
```

(**VKBD.LOCKUP-ASSIGNMENTP**
```
  (LAMBDA (ASSIGNMENT)                                      ; Edited 15-Dec-87 16:48 by Snow
    (AND (EQ (CADR ASSIGNMENT)
             'LOCKUP)
         (OR (NULL (CDDR ASSIGNMENT))
             (EQ (CDDR ASSIGNMENT)
                 'IGNORE)))))
```

(**VKBD.PARSE-CHAR-CODE**
```
  (LAMBDA (CHARSPEC)                                        ; Edited 29-Feb-96 10:29 by rmk
```
    ;; Does the coercion to a character code, causing error if not possible. NIL is passed through.
```
    (COND
      ((AND (SMALLP CHARSPEC)
            (IGEQ CHARSPEC 0)
            (ILEQ CHARSPEC 65535))
       CHARSPEC)
      ((CHARCODE.DECODE CHARSPEC T))
```

```
            (CHARSPEC (ERROR "ILLEGAL CHARACTER SPECIFICATION" CHARSPEC)))))
```

(VKBD.PARSE-KEY-ASSIGNMENT
```
  (LAMBDA (KEY-ASSIGNMENT CONFIG UNKNOWNOK)                          ; Edited 27-Apr-2018 22:38 by rmk:
                                                                    ; Edited 27-Mar-2018 12:02 by rmk:
                                                                    ; Edited 27-Mar-2018 12:00 by rmk:
                                                                    ; Edited 13-Dec-96 17:26 by rmk:
                                                                    ; Edited  7-Mar-96 12:29 by rmk
```
```
    ;; Parses a key assignment using information in CONFIG.  Value returned is an image of the key assignment with the key coerced to a keynumber
    ;; and also the character specifications coerced to codes.  This is what goes into the COMPLETEKEYASSIGNMENTS field.  If UNKNOWNOK,
    ;; returns NIL as the keyid if it isn't found in the CONFIG (or if the CONFIG isn't given (on calls from LOADKEYBOARDDISPLAYFONTS).
```
```
    (PROG (KEY TRKEY UNSHIFTED-CHAR SHIFTED-CHAR LOCK/NOLOCK DOWN UP)
          (CL:UNLESS (CDR (LISTP KEY-ASSIGNMENT))
                 (ERROR "ILLEGAL KEY ASSIGNMENT" KEY-ASSIGNMENT))
          (SETQ KEY (CAR KEY-ASSIGNMENT))
          (CL:UNLESS (SETQ TRKEY (VKBD.TRANSLATE-KEY-ID KEY CONFIG))
              (CL:UNLESS UNKNOWNOK
                  (ERROR (CONCAT "KEY NOT KNOWN IN CONFIGURATION " (FETCH CONFIGURATIONNAME OF CONFIG))
                         KEY-ASSIGNMENT)))
          (OR T (CL:UNLESS (VKBD.CHAR-ASSIGNMENTP KEY-ASSIGNMENT)

                    ;; Not sure what else it should be.  Perhaps cause an error?

                    (RETURN NIL)))
          (CL:WHEN (LISTP (SETQ DOWN (CADR KEY-ASSIGNMENT)))
              (SETQ UNSHIFTED-CHAR (VKBD.PARSE-CHAR-CODE (CAR DOWN)))
                                                                    ; RMK: LOCKSHIFT is in CADDDR not CADDR
              (SETQ DOWN (LIST (VKBD.PARSE-CHAR-CODE (CAR DOWN))
                               (IF (CADR DOWN)
                                   THEN (VKBD.PARSE-CHAR-CODE (CADR DOWN))
                                 ELSE UNSHIFTED-CHAR)
                               (SELECTQ (CADDR DOWN)
                                   ((NIL LOCKSHIFT LS)
                                    'LOCKSHIFT)
                                   ((NLS NOLOCKSHIFT)
                                    'NOLOCKSHIFT)
                                   (ERROR "INVALID LOCKSHIFT SPECIFICATION" KEY-ASSIGNMENT)))))
          (CL:WHEN (LISTP (SETQ UP (CDDR KEY-ASSIGNMENT)))
              (SETQ UNSHIFTED-CHAR (VKBD.PARSE-CHAR-CODE (CAR UP)))
              (SETQ UP (LIST (VKBD.PARSE-CHAR-CODE (CAR UP))
                             (IF (CADR UP)
                                 THEN (VKBD.PARSE-CHAR-CODE (CADR UP))
                               ELSE UNSHIFTED-CHAR)
                             (SELECTQ (CADDR UP)
                                 ((NIL LOCKSHIFT LS)
                                  'LOCKSHIFT)
                                 ((NLS NOLOCKSHIFT)
                                  'NOLOCKSHIFT)
                                 (ERROR "INVALID LOCKSHIFT SPECIFICATION" KEY-ASSIGNMENT)))))
          (RETURN `(,TRKEY ,DOWN ,@UP)))))
```

(VKBD.RESET-KEYBOARD-WINDOW
```
  (LAMBDA (WINDOW)                                                  ; Edited 27-Feb-96 21:22 by rmk
    (LET (SHADED-KEY)
         (IF (SETQ SHADED-KEY (WINDOWPROP WINDOW 'VKBD.SHADED-KEY))
             THEN (VKBD.INVERT-KEY SHADED-KEY WINDOW)
                  (WINDOWPROP WINDOW 'VKBD.SHADED-KEY NIL))
         (IF (WINDOWPROP WINDOW 'VKBD.SHIFT-DOWN)
             THEN (VKBD.INVERT-SHIFT-KEYS WINDOW)
                  (WINDOWPROP WINDOW 'VKBD.SHIFT-DOWN NIL))
         (WINDOWPROP WINDOW 'VKBD.LAST-MOUSE-STATE NIL))))
```

(VKBD.SEND-CHARACTER
```
  (LAMBDA (KEY WINDOW)                                              ; Edited 28-Feb-96 14:35 by rmk
    (LET (KEY-ASSIGNMENT CHAR-CODE (CONFIG (VKBD.GET-CONFIGURATION WINDOW)))
         (SETQ KEY (VKBD.TRANSLATE-KEY-ID KEY CONFIG))
         (COND
            ((VKBD.LOCK-KEYP KEY WINDOW)
             (WINDOWPROP WINDOW 'VKBD.LOCKED (NOT (WINDOWPROP WINDOW 'VKBD.LOCKED)))
             (VKBD.INVERT-LOCK-KEYS WINDOW))
            (T (SETQ KEY-ASSIGNMENT (FASSOC KEY (FETCH (VIRTUALKEYBOARD COMPLETEKEYASSIGNMENTS)
                                                     OF (WINDOWPROP WINDOW 'VKBD.KEYBOARD))))
               (COND
                  ((VKBD.CHAR-ASSIGNMENTP KEY-ASSIGNMENT)
                   (SETQ CHAR-CODE (COND
                                      ((OR (KEYDOWNP 'RSHIFT)
                                           (KEYDOWNP 'LSHIFT)
                                           (WINDOWPROP WINDOW 'VKBD.SHIFT-DOWN)
                                           (AND (EQ (VKBD.LOCK/NOLOCK KEY-ASSIGNMENT)
                                                    'LOCKSHIFT)
                                                (WINDOWPROP WINDOW 'VKBD.LOCKED)))
                                       (VKBD.SHIFTED-CHAR KEY-ASSIGNMENT))
                                      (T (VKBD.UNSHIFTED-CHAR KEY-ASSIGNMENT)))))
                  (COND
```

```
                    (CHAR-CODE (BKSYSBUF (CHARACTER CHAR-CODE)))))))))))))
```

(**VKBD.SHIFT-ASSIGNMENTP**
  (LAMBDA (ASSIGNMENT)   ; Edited 15-Dec-87 16:50 by Snow
    (OR (AND (EQ (CADR ASSIGNMENT)
                 '1SHIFTDOWN)
             (EQ (CDDR ASSIGNMENT)
                 '1SHIFTUP))
        (AND (EQ (CADR ASSIGNMENT)
                 '2SHIFTDOWN)
             (EQ (CDDR ASSIGNMENT)
                 '2SHIFTUP)))))

(**VKBD.SHIFTED-CHAR**
  (LAMBDA (KEY-ASSIGNMENT)   ; Edited 15-Dec-87 16:50 by Snow
    (CADADR KEY-ASSIGNMENT)))

(**VKBD.UNDEFINE-KEYBOARD**
  (LAMBDA (KEYBOARD-NAME)   ; Edited 25-May-95 11:45 by rmk:
    (**IF** (EQ KEYBOARD-NAME 'DEFAULT)
        THEN (PROMPTPRINT "Cannot delete the default keyboard. ")
      ELSE (SETQ VKBD.KNOWN-KEYBOARDS (REMOVE (**FINDVIRTUALKEYBOARD** KEYBOARD-NAME)
                                           VKBD.KNOWN-KEYBOARDS)))))

(**VKBD.UNSHIFTED-CHAR**
  (LAMBDA (KEY-ASSIGNMENT)   ; Edited 15-Dec-87 16:50 by Snow
    (CAADR KEY-ASSIGNMENT)))
)

(ADDTOVAR **CHARACTERNAMES**
          (BREAK 2)
          (HOME 524)
          (PGUP 525)
          (END 527)
          (PGDN 528)
          (INS 529)
          (HELP 517)
          (SCRL 521)
          (NUMLK 522)
          (CLEAR 523)
          (DOIT 555)
          (CENTER 577)
          (NOTCENTER 609)
          (BOLD 578)
          (NOTBOLD 610)
          (ITALIC 579)
          (NOTITALIC 611)
          (UCASE 580)
          (LCASE 612)
          (STRIKEOUT 581)
          (NOTSTRIKEOUT 613)
          (UNDERLINE 582)
          (NOTUNDERLINE 614)
          (SUBSCRIPT 583)
          (SUPERSCRIPT 615)
          (SMALLER 584)
          (LARGER 616)
          (MARGINS 585)
          (NOTMARGINS 617)
          (LOOKS 587)
          (NOTLOOKS 619)
          (F11 588)
          (NOTF11 620)
          (F12 589)
          (NOTF12 621))

(DECLARE\: EVAL@COMPILE

(RECORD KEYBOARDCONFIGURATION (CONFIGURATIONNAME KBCDUMMY1 KEYREGIONS KBCDUMMY2 DEFAULTASSIGNMENT
                                      KEYNAMESMAPPING KEYBOARDTYPE KEYLABELS KEYLABELSFONT BACKGROUNDSHADE
                                      KEYBOARDDISPLAYFONT CHARLABELS)

        ;; Dummy fields so length test still works

        (**TYPE?** (EQLENGTH DATUM (CONSTANT (LENGTH (RECORDFIELDNAMES 'KEYBOARDCONFIGURATION)))))
        KEYBOARDTYPE _ (KEYBOARDTYPE)
        KEYLABELSFONT _ DEFAULTKEYBOARDLABELSFONT BACKGROUNDSHADE _ 23130 KEYBOARDDISPLAYFONT _
        DEFAULTKEYBOARDDISPLAYFONT)

(RECORD VIRTUALKEYBOARD (KEYBOARDNAME KEYASSIGNMENTS KEYBOARDCONFIGURATION KEYBOARDDISPLAYFONT)
        (HASHLINK VIRTUALKEYBOARD (COMPLETEKEYASSIGNMENTS VKBDHASHARRAY 20)))
)
```

```
(DECLARE\: EVAL@COMPILE

(GLOBALVARS VKBDHASHARRAY)
)

(SETUPHASHARRAY 'VKBDHASHARRAY 20)

(RPAQ? VKBD.LOADED-KEYBOARDS NIL)

(RPAQ? VKBD.KNOWN-KEYBOARDS NIL)

(FILESLOAD (SOURCE)
       KEYBOARDCONFIGS)

(RPAQQ VKBD.BACKGROUND-MENU-SUBITEMS
       (SUBITEMS ("Switch keyboard" '(ADD.PROCESS '(SWITCHKEYBOARDS T))
                        "Switches the key actions of the keyborad.")
              ("Switch and display" '(ADD.PROCESS '(SWITCHKEYBOARDS T T))
                     "Switches the key actions of the keyboards and displays the new keyboard. the displayed
                     keyboard can be used as a menu.")
              ("Display only" '(ADD.PROCESS '(SWITCHKEYBOARDS NIL T))
                     "Displays the new keyboard. The displayed keyboard can be used as a menu.")
              ("Store keyboards" '(ADD.PROCESS '(VKBD.STORE-FILE-COMMAND)
                                    'WINDOW PROMPTWINDOW)
                     "Stores the current known keyboards")
              ("Load keyboards file" '(ADD.PROCESS '(VKBD.LOAD-FILE-COMMAND)
                                         'WINDOW PROMPTWINDOW)
                     "Adds definition of keyboards found on file. If a keyboard with the same name is already
                     known to the system DO NOT redefine it. "
                     (SUBITEMS ("Replace" '(ADD.PROCESS '(VKBD.LOAD-FILE-COMMAND NIL T)
                                             'WINDOW PROMPTWINDOW)
                                    "Removes the current known definitions and loads predefined keyboards .")
                            ("Add, don't redefine" '(ADD.PROCESS '(VKBD.LOAD-FILE-COMMAND NIL NIL)
                                                       'WINDOW PROMPTWINDOW)
                                    "Adds definition of keyboards found on file. If a keyboard with the same name
                                    is already known to the system DO NOT redefine it. ")
                            ("Add, redefine" '(ADD.PROCESS '(VKBD.LOAD-FILE-COMMAND T NIL)
                                                 'WINDOW PROMPTWINDOW)
                                    "Adds definitions of keyboards found on file. If a keyboard with the same
                                    name is already known to the system, REDEFINE ir")))
              ("Remove keyboard" '(ADD.PROCESS '(VKBD.REMOVE-KEYBOARD-COMMAND))
                     "Removes a keyboard from the list of known keyboards")
              ("Edit" (ADD.PROCESS '(VKBD.EDIT-KEYBOARD-COMMAND T))
                     "Calls the keyboard editor. Will prompt for name for the new keyboard, and will use the
                     default keyboard as the initial keyboard"
                     (SUBITEMS ("New Keyboard, default initial" '(ADD.PROCESS '(VKBD.EDIT-KEYBOARD-COMMAND T))
                                    "Calls the keyboard editor. Will prompt for name for the new keyboard, and
                                    will use the default keyboard as the initial keyboard")
                            ("New keyboard, other initial" '(ADD.PROCESS '(VKBD.EDIT-KEYBOARD-COMMAND T T))
                                    "Calls the keyboard editor. Will prompt for name for the new keyboard, and
                                    will pop up a menu of the current known keyboards. The selected one will be
                                    used as the initial keyboard")
                            ("Existing keyboard" '(ADD.PROCESS '(VKBD.EDIT-KEYBOARD-COMMAND))
                                    "Will let you select a keyboard from list of the known keyboards, and will
                                    calls the keyboard editor on the selected keyboard.")))))

(RPAQQ VKBD.NON-CHAR-ASSIGNMENTS-LABELS ((SHIFT SHIFT)
                                         (CTRL CTRL)
                                         (META META)
                                         (LOCK LOCK)
                                         (LOCKUP LOCKUP)
                                         (LOCKDOWN LOCKDOWN)))

(RPAQQ VKBD.WINDOW-MENU-SUBITEMS
       (SUBITEMS ("Switch keyboard" (FUNCTION (LAMBDA (W
                                                (SWITCHKEYBOARDS T NIL W)))
                     "Switches the key actions of the keyborad.")
              ("Switch and display" (FUNCTION (LAMBDA (W
                                                (SWITCHKEYBOARDS T T W)))
                     "Switches the key actions of the keyboards and displays the new keyboard. the displayed
                     keyboard can be used as a menu.")
              ("Display only" (FUNCTION (LAMBDA (W
                                          (SWITCHKEYBOARDS NIL T W)))
                     "Displays the new keyboard. The displayed keyboard can be used as a menu.")
              ("Store keyboards" (FUNCTION (LAMBDA (W
                                             (ADD.PROCESS (FUNCTION (VKBD.STORE-FILE-COMMAND))
                                                'WINDOW PROMPTWINDOW)))
                     "Stores the current known keyboards")
              ("Load keyboards file" (FUNCTION (LAMBDA (W
                                                 (ADD.PROCESS (FUNCTION (VKBD.LOAD-FILE-COMMAND))
                                                    'WINDOW PROMPTWINDOW)))
                     "Adds definition of keyboards found on file. If a keyboard with the same name is already
                     known to the system DO NOT redefine it. "
                     (SUBITEMS ("Replace" (FUNCTION (LAMBDA (W
                                                      (ADD.PROCESS (FUNCTION (VKBD.LOAD-FILE-COMMAND NIL T)
                                                         )
                                                         'WINDOW PROMPTWINDOW)))
```

```
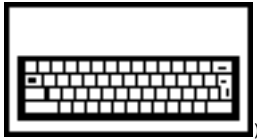                                            "Removes the current known definitions and loads predefined keyboards .")
                        ("Add, don't redefine" (FUNCTION (LAMBDA (W)
                                                     (ADD.PROCESS (FUNCTION (
                                                                   VKBD.LOAD-FILE-COMMAND
                                                                   ))
                                                     'WINDOW PROMPTWINDOW)))
                        "Adds definition of keyboards found on file. If a keyboard with the same name
                        is already known to the system DO NOT redefine it. ")
                        ("Add, redefine" (FUNCTION (LAMBDA (W)
                                                     (ADD.PROCESS (FUNCTION (VKBD.LOAD-FILE-COMMAND
                                                                   T NIL))
                                                     'WINDOW PROMPTWINDOW)))
                        "Adds definitions of keyboards found on file. If a keyboard with the same
                        name is already known to the system, REDEFINE ir")))
                  ("Remove keyboard" (FUNCTION (LAMBDA (W)
                                                 (ADD.PROCESS '(VKBD.REMOVE-KEYBOARD-COMMAND)))))
                  "Removes a keyboard from the list of known keyboards")))
```

(RPAQQ **VKBD.ICON**

)

(RPAQQ **VKBD.MASK**

)

(DECLARE\: DOEVAL@COMPILE DONTCOPY

(GLOBALVARS VKBD.BACKGROUND-MENU-SUBITEMS VKBD.DEFAULT-CONFIGURATION-NAME VKBD.KNOWN-KEYBOARDS
       VKBD.NON-CHAR-ASSIGNMENTS-LABELS VKBD.ICON VKBD.MASK CURRENTKEYBOARDCONFIG VKBD.CONFIGURATIONS
       VKBD.COMMONCODELABELS VKBD.COMMONKEYLABELS VKBD.COMMONDEFAULTASSIGNMENT)
)

(RPAQ? **CURRENTKEYBOARDCONFIG** NIL)

(DECLARE\: FIRST

(MOVD? '\\KEYBOARDEVENTFN '\\OLDKEYBOARDEVENTFN)
)

(RPAQ? **ORIGINALDEFAULTKEYACTION**)

(DEFINEQ

(**VKBD.\\KEYBOARDEVENTFN**
  (LAMBDA (FDEV EVENT EXTRA)   ; Edited 1-Mar-96 23:27 by rmk

    ;; call the old keyboard event function, then make sure to reset the Virtual keyboard keyaction tables.

    (\\OLDKEYBOARDEVENTFN FDEV EVENT EXTRA)
    (SELECTQ EVENT
        ((BEFORELOGOUT BEFOREMAKESYS BEFORESYSOUT BEFORESAVEVM)
            (SETQ \\VKBD.KEYBOARD.BEFORETYPE (KEYBOARDTYPE)))
        ((AFTERLOGOUT AFTERMAKESYS AFTERSYSOUT AFTERSAVEVM)
            (CL:UNLESS (EQ (KEYBOARDTYPE)
                           \\VKBD.KEYBOARD.BEFORETYPE)
                (SETQ VKBD.DEFAULT-CONFIGURATION-NAME (KEYBOARDTYPE))
                (SETQ CURRENTKEYBOARDCONFIG (**VKBD.GET-CONFIGURATION** (KEYBOARDTYPE)))

                ;; If keyboardtype has changed, we start by setting default keyaction table to the settings it had at the time that virtualkeyboards
                ;; was originally loaded.

                (RESETKEYACTION \\DEFAULTKEYACTION \\ORIGINALDEFAULTKEYACTION T)
                (**VKBD.ADD-DEFAULT-KEYBOARD** VKBD.DEFAULT-CONFIGURATION-NAME)
                (**VKBD.RESETKEYACTIONTABLES**)))
        NIL)))

(**VKBD.RESETKEYACTIONTABLES**
  (LAMBDA NIL   ; Edited 4-Mar-96 13:49 by rmk
                                                                   ; Edited 16-Feb-95 18:23 by rmk:

    ;; Reinstantiate/recomplete all keyboards that were previously operational, and insure that there is a DEFAULT for the new type. Probably should
    ;; also redraw any open keyboard windows...later.

    (CL:UNLESS (**FINDVIRTUALKEYBOARD** 'DEFAULT)

        ;; This will look for new keyboard files whenever real keyboard changes.

        (**VKBD.INIT**))
    (CLRHASH VKBDHASHARRAY)

    ;; Throw away any cached information, including COMPLETEKEYASSIGNMENTS

    (**FOR** KEYBOARD TABLE **IN** VKBD.KNOWN-KEYBOARDS **DO** (CL:WHEN (SETQ TABLE (GETPROP (**FETCH** (VIRTUALKEYBOARD
```

```
                                                                                  KEYBOARDNAME)
                                                           OF KEYBOARD)
                                                   'KEYACTIONTABLE))
                               (VKBD.CREATE-KEYACTION-TABLE (FETCH (VIRTUALKEYBOARD
                                                                      KEYBOARDNAME)
                                                                 OF KEYBOARD)
                           TABLE)))))
)

(MOVD 'VKBD.\\KEYBOARDEVENTFN '\\KEYBOARDEVENTFN)

(DECLARE\: FIRST

(MOVD? 'KEYACTION 'OLDKEYACTION)
)

(DEFINEQ

(NEWKEYACTION
  (LAMBDA (KEYNAME ACTIONS TABLE)                                ; Edited  7-Mar-96 11:10 by rmk
    ;; \NKEYS is a constant from LLKEY.
    (PROG (KEYBOARD (KEYNUM (OR (VKBD.TRANSLATE-KEY-ID KEYNAME CURRENTKEYBOARDCONFIG)
                                (\\KEYNAMETONUMBER KEYNAME))))
      ;; Handle the NIL-TABLE cases.
            (COND
              ((AND (NULL TABLE)
                    (LISTP ACTIONS)
                    (OR (FMEMB (CAR ACTIONS)
                               MODEACTIONS)
                        (FMEMB (CDR ACTIONS)
                               MODEACTIONS)))
                ;; If we are setting a mode (as opposed to a character) key, assume that it is intended to be set in all keyboards where that key is still
                ;; an appropriate mode
                (FOR KEYBOARD KEYACTION (ORIGKEYACTION _ (CDR (FASSOC KEYNUM \\ORIGKEYACTIONS)))
                     (MODEACTION _ (CDR (FASSOC KEYNUM MODEKEYS))) IN VKBD.KNOWN-KEYBOARDS
                   DO (SETQ KEYACTION (CDR (FASSOC KEYNUM (FETCH COMPLETEKEYASSIGNMENTS OF KEYBOARD))))
                      (COND
                        ((EQUAL KEYACTION ACTIONS))
                        ((OR (NULL KEYACTION)
                             (EQUAL KEYACTION ORIGKEYACTION)
                             (EQUAL KEYACTION MODEACTION))
                          (NEWKEYACTION KEYNAME ACTIONS KEYBOARD)))
                   FINALLY (RPLACD (OR (FASSOC KEYNUM MODEKEYS)
                                       (CAR (PUSH MODEKEYS (CONS KEYNUM))))
                                   ACTIONS))
                (RETURN T)                                       ; This will cause an error if we try to pass it back in.  What else
                                                                 ; can we do?

              ))

;;; get the keyboard or key action table.
            (COND
              ((NULL TABLE)
               (SETQ TABLE \\CURRENTKEYACTION))
              ((LITATOM TABLE)
               (COND
                 ((SETQ KEYBOARD (FASSOC TABLE VKBD.KNOWN-KEYBOARDS))
                  (SETQ TABLE (GETPROP TABLE 'KEYACTIONTABLE)))
                 (T (ERROR TABLE "is not a defined keyboard."))))
              ((LISTP TABLE)
               (COND
                 ((FMEMB TABLE VKBD.KNOWN-KEYBOARDS)
                  (SETQ KEYBOARD TABLE)
                  (SETQ TABLE (GETPROP (FETCH KEYBOARDNAME OF TABLE)
                                       'KEYACTIONTABLE)))
                 (T (ERROR TABLE "is not a defined keyboard."))))
              (T (FOR VKBD IN VKBD.KNOWN-KEYBOARDS WHEN (EQ TABLE (GETPROP (FETCH KEYBOARDNAME OF VKBD)
                                                                          'KEYACTIONTABLE))
                    DO (SETQ KEYBOARD VKBD))))
      ;; If TABLE is NIL, means that we are setting a virtual keyboard for which a keyaction table hasn't yet been created.
            (RETURN (PROG1 (COND
                             (TABLE (OLDKEYACTION KEYNUM ACTIONS TABLE))
                             (KEYBOARD                           ; virtual keyboard package allows incomplete keyboards with
                                                                 ; defaults from \ORIGKEYACTIONS.
                               (CDR (IF (FETCH COMPLETEKEYASSIGNMENTS OF KEYBOARD)
                                        THEN (FASSOC KEYNUM (FETCH COMPLETEKEYASSIGNMENTS OF KEYBOARD))
                                        ELSE (LET (A)
                                               (IF (SETQ A (OR (VKBD.KEY-ASSOC KEYNAME
                                                                 (FETCH KEYASSIGNMENTS OF KEYBOARD)
                                                                 CURRENTKEYBOARDCONFIG)
                                                               (VKBD.KEY-ASSOC KEYNAME
```

```
                                                      (FETCH DEFAULTASSIGNMENT OF
                                                                      CURRENTKEYBOARDCONFIG
                                                               )
                                                   CURRENTKEYBOARDCONFIG)
                                            (VKBD.KEY-ASSOC KEYNAME
                                                   VKBD.COMMONDEFAULTASSIGNMENT
                                                   CURRENTKEYBOARDCONFIG)))
                              THEN (VKBD.PARSE-KEY-ASSIGNMENT A
                                             CURRENTKEYBOARDCONFIG)
                              ELSE (FASSOC KEYNUM \\ORIGKEYACTIONS))))))
                        (T (SHOULDNT)))
                 (COND
                    ((AND KEYBOARD ACTIONS)
```
;; Set the keyaction in the virtual keyboard, which keeps it consistent with the corresponding table.
```
                     (CL:WHEN (FETCH COMPLETEKEYASSIGNMENTS OF KEYBOARD)
                        (PUTASSOC KEYNUM (CDR (VKBD.PARSE-KEY-ASSIGNMENT (CONS KEYNUM ACTIONS)
                                                     CURRENTKEYBOARDCONFIG))
                               (FETCH COMPLETEKEYASSIGNMENTS OF KEYBOARD)))
                     (IF (FETCH KEYASSIGNMENTS OF KEYBOARD)
                         THEN (PUTASSOC KEYNAME ACTIONS (FETCH KEYASSIGNMENTS OF KEYBOARD))
                         ELSE (PUSH (FETCH KEYASSIGNMENTS OF KEYBOARD)
                                    (CONS KEYNAME ACTIONS)))))))))))
)

(MOVD 'NEWKEYACTION 'KEYACTION)

(RPAQ? MODEKEYS )

(RPAQQ MODEACTIONS (EVENT CTRLUP CTRLDOWN 1SHIFTUP 1SHIFTDOWN 2SHIFTUP 2SHIFTDOWN LOCKUP LOCKDOWN LOCKTOGGLE
                          METAUP METADOWN FONTUP FONTDOWN FONTTOGGLE USERMODE1UP USERMODE1DOWN USERMODE1TOGGLE
                          USERMODE2UP USERMODE2DOWN USERMODE2TOGGLE USERMODE3UP USERMODE3DOWN USERMODE3TOGGLE)
)

(DECLARE\: DOEVAL@COMPILE DONTCOPY

(GLOBALVARS MODEKEYS MODEACTIONS)
)

(ADDTOVAR BREAKRESETFORMS ((LAMBDA (K)
                                  (PROCESS.KEYBOARD NIL K))
                           'DEFAULT))

(DEFINEQ
```

(**FIXKEYBOARD**
```
  (LAMBDA (KBD)                                                    ; Edited 28-Feb-96 13:36 by rmk
```
;; This is a function use to coerce existing keyboards into a more reasonable format. It makes the keynames be names from the KEYNAMES
;; mapping instead of key numbers, makes the characters be readable characters instead of codes, and eliminates actions that duplicate the
;; keyboards defaultassignment actions.   Only reasonable codes are mapped to characters--8-bit non-control range plus the Latin rendering
;; (charset 241)
```
    (LET ((KC (VKBD.GET-CONFIGURATION (FETCH KEYBOARDCONFIGURATION OF KBD))))
```
       ;; Fix keyassignments and then remove duplicates of default keyassignments
```
       (REPLACE KEYASSIGNMENTS OF KBD WITH (SORT (FOR KA (DEF _ (FETCH DEFAULTASSIGNMENT OF KC))
                                                   IN (FIXKEYASSIGNMENTS (FETCH KEYASSIGNMENTS
                                                                                OF KBD)
                                                             KC)
                                                   UNLESS (MEMBER KA DEF) COLLECT KA)
                                              T)))))
```

(**FIXKEYBOARDCONFIG**
```
  (LAMBDA (CONFIG)                                                 ; Edited 29-Feb-96 13:27 by rmk
```
;; Makes sure that CONFIG obeys keynaming conventions that force all reference to be by name and insure that names are not digits.
```
    (LET (KEYNUMBERTONAME)
        (FOR KN NAME FNAME FOUND IN (FETCH KEYNAMESMAPPING OF CONFIG)
           DO (SETQ NAME (IF (AND (SMALLP (CAR KN))
                                  (IGEQ (CAR KN)
                                        0)
                                  (ILEQ (CAR KN)
                                        9))
                             THEN (CL:INTERN (CONCAT (CAR KN))
                                          'INTERLISP)
                             ELSE (CAR KN)))
              (IF (NULL (SETQ FOUND (ASSOC (CADR KN)
                                           KEYNUMBERTONAME)))
                  THEN (PUSH KEYNUMBERTONAME (LIST (CADR KN)
                                                        NAME))
                  ELSEIF (OR (EQ NAME (SETQ FNAME (CADR FOUND)))
                             (AND (EQ 1 (NCHARS FNAME))
                                  (OR (AND (IGEQ (CHCON1 FNAME)
                                                 (CHARCODE 0))
                                           (ILEQ (CHCON1 FNAME)
```

```
                                                    (CHARCODE 9)))
                                      (EQ FNAME (U-CASE NAME)))))
            ELSE  ;; This is the preferred name.  We prefer digit-names and upper-case equivalents
                              (RPLACA (CDR FOUND)
                                      NAME)))
        ;; Coerce digit keynames to atoms
        (FOR K IN (FETCH KEYNAMESMAPPING OF CONFIG) WHEN (AND (SMALLP (CAR K))
                                                             (IGEQ (CAR K)
                                                                   0)
                                                             (ILEQ (CAR K)
                                                                   9))

            DO (RPLACA K (CL:INTERN (CONCAT (CAR K))
                                    'INTERLISP)))
        ;; Introduce ZERO, ONE... synonyms for digit keys
        (NCONC (FETCH KEYNAMESMAPPING OF CONFIG)
               (FOR I FROM 0 AS N IN '(ZERO ONE TWO THREE FOUR FIVE SIX SEVEN EIGHT NINE)
                  UNLESS (ASSOC N (FETCH KEYNAMESMAPPING OF CONFIG)) COLLECT (LIST N (CL:INTERN (CONCAT
                                                                                                 I)
                                                                                         'INTERLISP))))
        (REPLACE KEYREGIONS OF CONFIG
           WITH (IF (FOR K IN (FETCH KEYREGIONS OF CONFIG) ALWAYS (KEYNUMBERP (CAR K)))
                    THEN (FOR K IN (FETCH KEYREGIONS OF CONFIG)
                            COLLECT (CONS (OR (CADR (ASSOC (CAR K)
                                                          KEYNUMBERTONAME))
                                             (HELP "UNNAMED KEYREGION KEY" K))
                                          (CDR K)))
                    ELSE (FOR K KN IN (FETCH KEYREGIONS OF CONFIG)
                            COLLECT (SETQ KN (CAR K))
                                    (CONS (IF (AND (SMALLP KN)
                                                   (IGEQ KN 0)
                                                   (ILEQ KN 9))
                                              THEN (CL:INTERN (CONCAT KN)
                                                              'INTERLISP)
                                              ELSE KN)
                                          (CDR K)))))
        (REPLACE DEFAULTASSIGNMENT OF CONFIG
           WITH (SORT (IF (FOR K IN (FETCH DEFAULTASSIGNMENT OF CONFIG) ALWAYS (KEYNUMBERP (CAR K)))
                          THEN (FOR K IN (FETCH DEFAULTASSIGNMENT OF CONFIG)
                                  COLLECT (CONS (OR (CADR (ASSOC (CAR K)
                                                                KEYNUMBERTONAME))
                                                   (HELP "UNNAMED KEYREGION KEY" K))
                                                (CDR K)))
                          ELSE (FOR K KN IN (FETCH DEFAULTASSIGNMENT OF CONFIG)
                                  COLLECT (SETQ KN (CAR K))
                                          (CONS (IF (AND (SMALLP KN)
                                                         (IGEQ KN 0)
                                                         (ILEQ KN 9))
                                                    THEN (CL:INTERN (CONCAT KN)
                                                                    'INTERLISP)
                                                    ELSE KN)
                                                (CDR K))))
                      T))
        ;; Convert char-codes to characters, more or less.
        (FIXKEYASSIGNMENTS (FETCH DEFAULTASSIGNMENT OF CONFIG)
                           CONFIG)
        (REPLACE KEYLABELS OF CONFIG
           WITH (SORT (IF (FOR K IN (FETCH KEYLABELS OF CONFIG) ALWAYS (KEYNUMBERP (CAR K)))
                          THEN (FOR K IN (FETCH KEYLABELS OF CONFIG)
                                  COLLECT (CONS (OR (CADR (ASSOC (CAR K)
                                                                KEYNUMBERTONAME))
                                                   (HELP "UNNAMED KEYREGION KEY" K))
                                                (CDR K)))
                          ELSE (FOR K KN IN (FETCH KEYLABELS OF CONFIG)
                                  COLLECT (SETQ KN (CAR K))
                                          (CONS (IF (AND (SMALLP KN)
                                                         (IGEQ KN 0)
                                                         (ILEQ KN 9))
                                                    THEN (CL:INTERN (CONCAT KN)
                                                                    'INTERLISP)
                                                    ELSE KN)
                                                (CDR K))))
                      T)))
        CONFIG))
```

(**FIXKEYASSIGNMENTS**
```
  (LAMBDA (KALIST CONFIG)                                            ; Edited  7-Mar-96 11:20 by rmk
```
        ;; Fix keynames and convert char-codes to characters, more or less. It makes the keynames be names from the KEYNAMES mapping instead of
        ;; key numbers, makes the characters be readable characters instead of codes, and eliminates actions that duplicate the keyboards
        ;; defaultassignment actions.   Only reasonable codes are mapped to characters--8-bit non-control range plus the Latin rendering (charset 241)

        ;; NOTE: This uses names and character labels from CONFIG, so it should only be run with key assignments that are already CONFIG
        ;; compatible.

```
(FOR KA CODE LAB (CHARLABELS _ (APPEND (FETCH CHARLABELS OF CONFIG)
                                            VKBD.COMMONCHARLABELS))
      (KNM _ (FETCH KEYNAMESMAPPING OF CONFIG)) IN KALIST
 DO  ;; First make keynames be the ones that are used in he keymapping

     (RPLACA KA (FOR KN FOUND IN KNM DO  ;; Give preference to digit-labels

                     (IF (NEQ (CAR KA)
                              (CADR KN))
                        ELSEIF (AND (SMALLP (CAR KN))
                                    (IGEQ (CAR KN)
                                          0)
                                    (ILEQ (CAR KN)
                                          9))
                          THEN (RETURN (CL:INTERN (CONCAT (CAR KN)
                                                          'INTERLISP)))
                        ELSEIF (AND (EQ 1 (NCHARS (CAR KN)))
                                    (SMALLP (NTHCHAR (CAR KN)
                                                     1)))
                          THEN (RETURN (CAR KN))
                        ELSEIF (NOT FOUND)
                          THEN (SETQ FOUND (CAR KN)))
                     FINALLY (RETURN (OR FOUND (CAR KA)))))
     ;; Shift to actions

     (SETQ KA (CDR KA))
     ;; Get rid of gratuitous uptransition ignores

     (CL:WHEN (EQ 'IGNORE (CDR KA))
             (RPLACD KA))
     ;; Shift to down transition

     (SETQ KA (CAR KA))
     ;; Make keyactions use characters in the ascii range instead of codes.  241 is Latin rendering

     (CL:WHEN (LISTP KA)
             ;; Eliminate unnecessary NOLOCKSHIFT when lower and upper are the same

             (IF (AND (EQ (CAR KA)
                          (CADR KA))
                      (MEMB (CADDR KA)
                            '(NOLOCKSHIFT NLS)))
                THEN (RPLACD (CDR KA))
                ELSE  ;; Introduce a shorter abbreviation

                     (SELECTQ (CADDR KA)
                         (LOCKSHIFT (RPLACD (CDR KA)
                                            'LS))
                         (NOLOCKSHIFT (RPLACD (CDR KA)
                                              'NLS))
                         NIL))
             (SETQ CODE (CAR KA))
             (IF (SMALLP CODE)
                THEN (RPLACA KA (IF (SMALLP CODE)
                                   THEN (IF (SETQ LAB (CADR (ASSOC CODE CHARLABELS)))
                                          ELSEIF (OR (AND (IGREATERP CODE 32)
                                                          (ILESSP CODE 255))
                                                     (EQ (LRSH CODE 8)
                                                         241))
                                            THEN (SETQ LAB (CHARACTER CODE))
                                                 (CL:IF (SMALLP LAB)
                                                        (CL:INTERN (CONCAT LAB)
                                                                   'INTERLISP)
                                                        LAB)
                                            ELSE (MKATOM (CHARCODESTRING CODE)))
                                   ELSEIF (STRINGP CODE)
                                     THEN (SETQ LAB (MKATOM CODE))
                                          (CL:IF (SMALLP LAB)
                                                 (CL:INTERN (CONCAT LAB)
                                                            'INTERLISP)
                                                 LAB)
                                   ELSE CODE)))
             ;; Shift to shift code

             (SETQ KA (CDR KA))
             (SETQ CODE (CAR KA))
             (IF (SMALLP CODE)
                THEN (RPLACA KA (IF (SMALLP CODE)
                                   THEN (IF (SETQ LAB (CADR (ASSOC CODE CHARLABELS)))
                                          ELSEIF (OR (AND (IGREATERP CODE 32)
                                                          (ILESSP CODE 255))
                                                     (EQ (LRSH CODE 8)
                                                         241))
                                            THEN (SETQ LAB (CHARACTER CODE))
                                                 (CL:IF (SMALLP LAB)
                                                        (CL:INTERN (CONCAT LAB)
                                                                   'INTERLISP)
```

```
                                                            LAB)
                                  ELSE   ;; Coerce to octal cset,ccode format

                                              (MKATOM (CHARCODESTRING CODE)))
                      ELSEIF (STRINGP CODE)
                        THEN (SETQ LAB (MKATOM CODE))
                             (CL:IF (SMALLP LAB)
                                    (CL:INTERN (CONCAT LAB)
                                               'INTERLISP)
                                    LAB)
                      ELSE CODE)))))
        ;; Remove duplicates, leaving the head of the list unchanged, and keeping first occurrences of duplicates

        (RPLACD KALIST (FOR XTAIL X ON (CDR KALIST) EACHTIME (SETQ X (CAR XTAIL))
                            UNLESS (THEREIS YTAIL ON KALIST UNTIL (EQ YTAIL XTAIL) SUCHTHAT (EQUAL X (CAR YTAIL)))
                            COLLECT (CAR XTAIL)))
        KALIST))

)

(DECLARE\: DONTEVAL@LOAD DOCOPY

(VKBD.INIT)
)

(MOVD? 'METASHIFT 'OLDMETASHIFT)

(DEFINEQ

(METASHIFT
  (LAMBDA FLG                                              ; Edited  6-Jul-2023 09:21 by rmk
                                                           ; Edited 16-Jun-92 08:44 by rmk:

    ;; Sets interpretation of swat key to first arg, where T means meta-shift, NIL means original setting.  Returns previous setting.  This differs from
    ;; LLKEY version in that it changes the \DORADOKEYACTIONS and \DEFAULTKEYACTION table to insure that the metashift remains in effect
    ;; across keyboard switches.
    (PROG* ((METASTATUS '(METADOWN . METAUP))
            (ARGUMENT (AND (IGREATERP FLG 0)
                           (COND
                             ((EQ (ARG FLG 1)
                                  T)
                              METASTATUS)
                             (T (OR (ARG FLG 1)
                                    (CDR (ASSOC 'BLANK-BOTTOM \\ORIGKEYACTIONS)))))))
            OLDSETTING)
           (SETQ OLDSETTING (KEYACTION 'BLANK-BOTTOM ARGUMENT))
      ;; Update \doradokeyactions table so we don't lose the change when we repalce the keyaction table.
           (CL:WHEN (EQ (KEYBOARDTYPE)
                        'DORADO)
               (COND
                 (ARGUMENT (PUTASSOC 'BLANK-BOTTOM ARGUMENT \\DORADOKEYACTIONS)
                           (KEYACTION 'BLANK-BOTTOM ARGUMENT \\DEFAULTKEYACTION))
                 (T (SETQ \\DORADOKEYACTIONS (|for| X |in| \\DORADOKEYACTIONS
                                                 |join| (AND (NEQ (CAR X)
                                                                  'BLANK-BOTTOM)
                                                             (LIST X))))
                    (KEYACTION 'BLANK-BOTTOM NIL \\DEFAULTKEYACTION))))
           (RETURN (COND
                     ((EQUAL OLDSETTING METASTATUS)
                      T)
                     (T OLDSETTING))))))
)


;; Call new definition if the old one had been called

(AND (MEMB (KEYBOARDTYPE)
           '(X DORADO))
     (EQUAL (KEYACTION 'BLANK-BOTTOM)
            '(METADOWN . METAUP))
     (METASHIFT T))

(FILESLOAD ICONW)

(DECLARE\: DONTEVAL@LOAD DOEVAL@COMPILE DONTCOPY COMPILERVARS

(ADDTOVAR NLAMA )

(ADDTOVAR NLAML )

(ADDTOVAR LAMA METASHIFT)
)

(PUTPROPS VIRTUALKEYBOARDS COPYRIGHT ("Venue & Xerox Corporation" 1985 1986 1987 1988 1990 1992 1993 1995
                               1996 2017 2018))
```

FUNCTION INDEX

VARIABLE INDEX

RECORD INDEX