By

Motor Control Hierarchy
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```
Move_Exact                          ; move with no smoothing
    Do_discall                      ; set up and call Distance
    Distance                        ; Set up sign byte for speeds
        Clrsign                     ; clear the sign bytes
        Compit?                     ; complemend a word<0
        Setssign                    ; set s.sign
        SetOsign                    ; setthe 0.sign
        Motion                      ; set up queue entry
            Check                   ; check velocity & distance error
            Doexact                 ; set up exact queue entry
            Blend                   ; set up blended entry
            Advance_queue           ; move the queue pointers
Move_Smooth                         ; do a blended queue entry
    Dodiscall                       ; set up and call Distance
Joy
    Clrsign
    Compit?
    Setssign
    Setosign
    Smul16
    Mov16
    Storz16
    Motion
```

ISR32ms Hieracrchecal DIagram

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```
INT32ms                         ; The ISR for motrs,headswitches

    Getspeed                    ; get current speed & distance

        Findir                  ; find current motor directions

        Spdmes                  ; get curretn motor speed

        Complx                  ; complement xdata word

        Mov16x                  ; mov a xdata word to X math reg

        Mov16W                  ; move xdata to W math regsiter

        Add16                   ; add z math reg=W+X

        Saul16                  ; Z=W+X

        Sub16                   ; Z=W-X

        Movcx                   ; move constant to X reg.

        Storz16                 ; store word Z to xdata

    Seq                         ; do motor sequenceing

    Motor                       ; Motor speed control

        calc0drv                ; calc theta pid value

            Calcptera           ; calc proportinal tera

            Calcitera           ; calc integral tera

            Calcdtera           ; calc differential tera

            Addsteras           ; sum up final PID tera

        Calcsdrv                ; calc s PID value

            Calc0ptera          ; Calc theta proportinional tera

            Calc0itera          ; calc theta integral

            Calc0dtera          ; calc theta diff tera
```

```
    AddOterms                ; sum up and get final theta PID
Calcdrv                      ; convert from s,0 to left,right
Calcpulse                    ; output the correct motor pulses
Misc                         ; do head,led,analyzer
    Anal                     ; output current motor stuff->xdat
    Ledswitch                ; do led and head
    Checkhead                ; do head autostop check
    Checkrange               ; check out of range condition
Fixdata                      ; setup for next ISR time
```

Hierarchy Chart of Topo Main Program

```
Poweron                                 ; hard reset entry
    Setup                               ; hardware and software init
Start                                   ; command decode entry point
    Spchoff                             ; turns off Echo rs232 port
    Sholoop                             ; output message to serial port
    Spchon                              ; Enable Echo serial port
    Ldelay                              ; delay x times 32 ms.
Decod                                   ; command decode loop
    Waitmess                            ; gets an IR message
        Resetagc                        ; setup IR receive hardware
        Waitmessage                     ; setup and wait til IR packet
            Enablerecv                  ; setup software IR for I5R256
            Checkrs232                  ; snack out speach while IR wait
            Calchecksum                 ; see if IR recv has bad sum
    Spchoff
    Decode                              ; decode IR command and call
        Various command handlers e.g. Dospch,Domove
    Sendit                              ; send IR response
        Movfromx                        ; move Xbuff to Ibuff
        Clearbuff                       ; move 0's to Ibuff
        Movtoxbuff                      ; move Ibuff to xbuff
        Sendsum                         ; calc IR packet checksum
        Enablesend                      ; setup to send packet via I5R256
```

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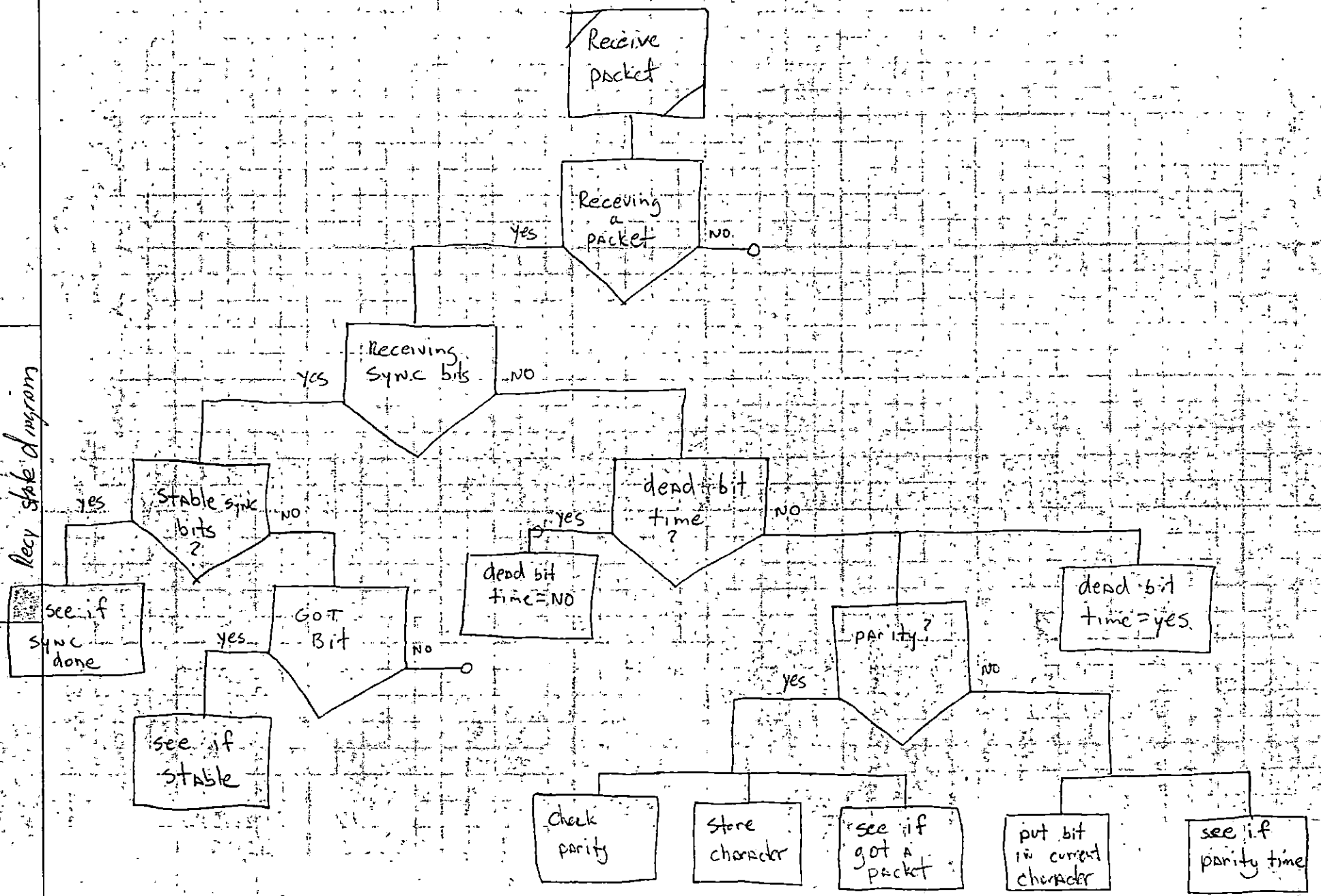
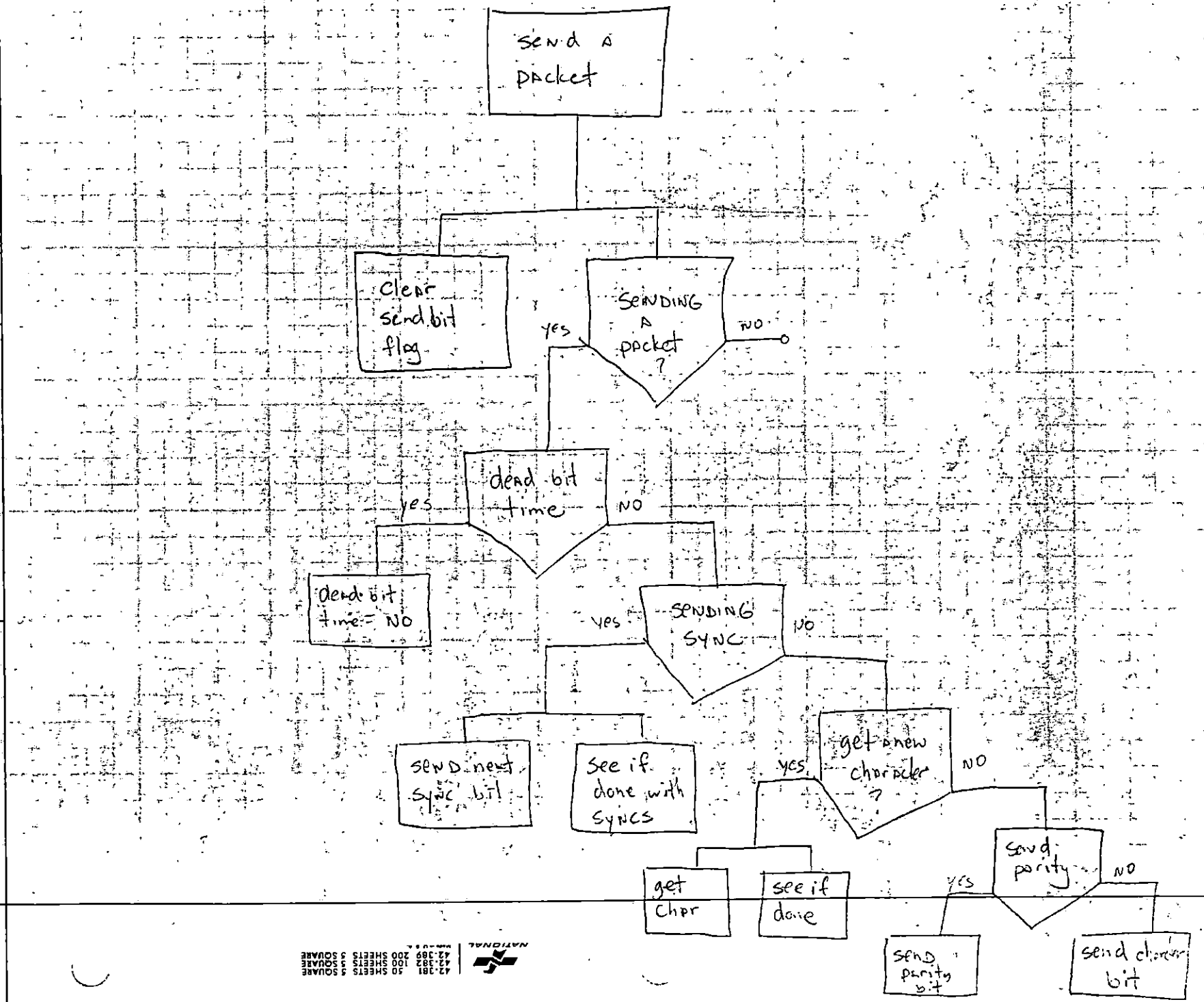
Recv state diagram




send a packet
clear send bit flag
SENDING A packet ?
yes
NO
dead bit time
yes
NO
dead bit time = NO
SENDING SYNC
yes
NO
send next sync bit
see if done with syncs
get new character ?
yes
NO
get char
see if done
send parity
yes
NO
send parity bit
send checker bit