


```

DDDDDDDD DDDDDDDD CCCCCCCC MM MM PPPPPPPP DDDDDDDD EEEEEEEEEE FFFFFFFFFF
DDDDDDDD DDDDDDDC DDDDDDDD CCCCCCCC MM MM PPPPPPPP DDDDDDDD EEEEEEEEEE FFFFFFFFFF
DD DD DD DD CC MMMM MMMM PP PP DD DD EE FF
DD DD DD DD CC MMMM MMMM PP PP DD DD EE FF
DD DD DD DD CC MM MM MM PP PP DD DD EE FF
DD DD DD DD CC MM MM MM PP PP DD DD EE FF
DD DD DD DD CC MM MM MM PPPPPPPP DD DD EEEEEEEE FFFFFFFF
DD DD DD DD CC MM MM MM PPPPPPPP DD DD EEEEEEEE FFFFFFFF
DD DD DD DD CC MM MM MM PP DD DD EE FF
DD DD DD DD CC MM MM MM PP DD DD EE FF
DD DD DD DD CC MM MM MM PP DD DD EE FF
DD DD DD DD CC MM MM MM PP DD DD EE FF
DDDDDDDD DDDDDDDD CCCCCCCC MM MM PP DDDDDDDD EEEEEEEEEE FF
DDDDDDDD DDDDDDDD CCCCCCCC MM MM PP DDDDDDDD EEEEEEEEEE FF

```

```

....
....
....
....

```

```

MM MM DDDDDDDD LL
MM MM DDDDDDDD LL
MMMM MMMM DD DD LL
MMMM MMMM DD DD LL
MM MM DD DD LL
MM MM DD DD LL
MM MM DD DD LL
MM MM DD DD LL
MM MM DD DD LL
MM MM DD DD LL
MM MM DDDDDDDD LLLLLLLLLL
MM MM DDDDDDDD LLLLLLLLLL

```

Version 'V04-000'

DDCMPDEF.MDL - System definitions for software DDCMP

```

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FACILITY: Software DDCMP

ABSTRACT: Definitions required for driver to DDCMP interface.

AUTHOR: M. M. Dumont CREATION DATE: 1-Apr-1981

Modified by:

- V03-004 MMD0292 Meg Dumont, 23-Apr-1984 14:55
Add some fields to help fix the retransmit out of order problems
- V03-003 MMD0206 Meg Dumont, 8-Dec-1983 12:56
Changes to support BISYNC operation over the DMF32 and
changes to support ASYCNH DDCMP.
- V03-002 MMD0169 Meg Dumont, 3-May-1983 12:52
Add space for the address of the device timer routine in
the TF block. Add DLK codes for timer startup and shutdown.
- V03-001 MMD0001 Meg Dumont, 30-Jun-1982 9:26
Add field in GF def's to allow user to set time when to
deselect the station.

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16-SEP-1984 16:37:58.^{K 14}98 Page 2

DDCMPDEF - Global constant definitions for DDCMP

```
$STRUCT DDCMP
C
  FILL,0           : Fill character
  HLT,0           : Protocol in halted state
  ADDR,1          : Station addr for all cntrl stations
  RUN,1           : Protocol in running state
  IST,2           : Protocol in start initiate state
  AST,3           : Protocol in start acknowledge state
  MNT,4           : Protocol in maintenane mode
  HEADER,6        : Six bytes of DDCMP header
  SIZEOF,127      : Max number of msgs allowed on queues
  BYTESIZE,8      : Size in bits of a byte
>
```

E

```

:
: MFD - Message field definitions for DDCMP data and maintenance message
: headers and for control messages.
:

```

```

$STRUCT MFD
F      MSGID,B      ; Message Identifier.
F      CNTFLG,W     ; Field containing count and flag
                        ; information for headers.
V      <
      .14           ; 14 bits of count or a byte ENQ type
                        ; and 6 bits of NAK type
      QSYNC,1,M     ; Receiver should expect a short syn.
      SELECT,1,M    ; For half duplex links only, receiver
                        ; becomes transmitter and visa versa.
S      >
      TYPFLG,0,W   ; Field containing type and flag info
                        ; for control messages.
C      <
      SUBTYP,0     ; Start of NAK sub type field
      SUBTYPL,6    ; Length of NAK sub type field
      >           ; Use bits in original definition.
F      RESP,B      ; Resp number of last correctly RCV'd
                        ; message for piggybacked ACK's.
F      NUMB,B      ; Transmit number of data message.
F      ADDR,B      ; Station addr, 1 for point-to-point.
L      LENGTH      ; Length of MSG (8 bytes of header).
E

```

:-
 XMTQ - Queue entry for transmits appended to top of buffer.
 :-

```

$STRUCT XMTQ

```

```

F      LINK,Q      : The foward and backward links
F      BUFLÉN,W    : Length of the buffer
F      BUFTYP,B    : Type of buffer
F      B           : Spare could be used for Fork IPL
F      IRP,L       : Address of the IRP associated with
                  : this transmit
F      TIMEND,L    : Time that the XMT'd message is
                  : sheduled to reply timeout only used
                  : when the stattion uses a real clock
                  : to time reply timeouts
F      BACC,L      : Buffer address and character count

```

: The next two fields must be in the same order as IRPSW_BOFF AND BCNT

```

F      MSGOFF,W    : Offset from PTE to msg start
F      MSGSIZE,W   : Size of msg including header
F      SLOT,B      : Store vector slot used for transmit
F      ERROR,W     : Device error status for XMT
F      FLAG,B      : Flag for ENQ messages
V      <M
      ONQUEUE,...M : Flag set when cntl msg is on a queue
      SELECT,...M  : Set by protcol if select flag is set
                  : in message to be sent
      CONTROL,...M : Set when the msg sent is a cntl msg
      4
      INTERNAL,...M : Reserved
                  : When set then the IRP was not issued
                  : via QIO, but by an internal method
      >
F      HCRC,W      : Header CRC for devices which don't
                  : already support CRC
F      DCRC,W      : Data CRC
F      MSGHDR,B,6  : Space for the message header
L      LENGTH

```

```

E

```

SSTRUCT TF

```

F      HDR,L,3      ; 3 longwords of header
; Notice default for CHAR is Full duplex control station on a sync line

F      CHAR,B      ; Device characteristics
V      <M
      STATYP,...M   ; 0 = Control      1 = Tributary
      POINT,...M    ; 0 = Point to point 1 = Multipoint
      DUPLEX,...M   ; 0 = Full duplex   1 = Half dplx
      >
F      ADDR,B      ; Station address, default is 1
F      XADDR,B     ; XMT station address default is 1
F      RADDR,B     ; RCV station address default is 1
F      XGCNT,B     ; Count of number of free slots on XMTQ

```

: Message exchange fields

```

F      R,B         ; Highest sequential msg RCV'd
F      N,B         ; Highest sequential msg XMT'd
F      A,B         ; Highest sequential msg ACK'd
F      T,B         ; Next data msg to XMT
F      X,B         ; Last data msg to be XMT'd

```

: Timers

```

F      SELTIM,B    ; Selection and timer flags
V      <M
      SELECT,...M  ; When set then send the select flag
      OWNSELT,...M ; When set we own the select flag
      TIMER,...M   ; If set then the timer is running
      RCVDET,...M  ; Set when a msg is rcv'd used to
      ; determine if a selection has been
      ; acknowledged in some way
      NEXT,...M    ; Send the ACK next clock tick
      >
F      REPTIM,B    ; Type of reply timer
F      REPWAI,W    ; Amount of time to wait before timing
      ; the reply timer out. This field is
      ; only used for timing via a real clock
F      MAXRTO,B    ; Max number of reply timeouts allowed
F      CURRTO,B    ; Current number of reply timeouts
F      MSGCNT,B    ; Max number of messages allowed to
      ; send in one selection interval
F      MMCTR,B     ; Counter of these msgs
F      TEB,W      ; Size of counters block

```

```

: These fields must appear in the following order and offset because the
: driver expects to find the different protocols XMT and Complete queues
: in the same place.

```

```

F      CTLO,Q      ; List head for the control message Q
F      CMPQ,Q      ; List head for the CMPQ
F      XMTQ,Q      ; List head for the XMTQ
F      RTOQ,Q      ; List head for the RTOQ

```



```

F      XMTOVF,C      ; List head for the XMT overflow queue
F      BUFPTR,A     ; This field gets the value of
                  ; RB on entry to the protocol
F      GFB,A        ; Address of the global field block
F      DEV_TIMER,A  ; Address of device timer routine
F      XMT-INPR,A   ; Address of drivers inprogress list
F      POSTQ,A     ; Address of drivers post queue

; These fields must be at least as long as the XMTQ plus six bytes

F      QACK,L,12    ; Queue block for an ACK message
F      QNAK,L,12   ; Queue block for an NAK message
F      QREP,L,12   ; Queue block for an REP message
F      QSTR,L,12   ; Queue block for an STRT message
F      QSTACK,L,12 ; Queue block for an STACK message

F      TQE,L,15    ; Timer queue entry block
F      NAKRSN,B    ; NAK reason code
F      SFLAGS,B    ; Send an ENQ message flags
V      <M
      SNAK,...M    ; Send a NAK
      SACK,...M    ; Send an ACK
      SREP,...M    ; Send a REP
      >

; beginning of error counters
L      ERRSTRT     ; Start of error counters
F      DBRTYP,W    ; NMA definition for the field
F      DBYTR,L     ; Records bytes RCV'd by station
F      DBXTYP,W    ; NMA definition for the field
F      DBYTX,L     ; Records bytes XMT'd by station
F      DMRTYP,W    ; NMA definition for the field
F      DMSGR,L     ; Records msgs RCV'd by station
F      DMXTYP,W    ; NMA definition for the field
F      DMSGX,L     ; Records msgs XMT'd by station
F      SELTYP,W    ; NMA definition for the field
F      SELSP,W     ; Records selection intvls elapsed
F      DEOTYP,W    ; NMA def for field
F      DEOBC,W     ; Data errors outbound bit counters
V      <M
      OHCRC,...M   ; NAK's RCV'd header CRC reason code 1
      ODCRC,...M   ; NAK's RCV'd data CRC reason code 2
      OREPS,...M   ; NAK's RCV'd REP response rsn code 3
      >
F      DEO,B       ; Data errors outbound
F      DEITYP,W    ; NMA def for field
F      DEIBC,W     ; Data errors inbound bit counters
V      <M
      IHCRC,...M   ; NAK's XMT'd header CRC reason code 1
      IDCRC,...M   ; NAK's XMT'd data CRC reason code 2
      IREPS,...M   ; NAK's XMT'd REP response rsn code 3
      >
F      DEI,B       ; Data error inbound
F      LBETYP,W    ; NMA definition for the field
F      LBEBBC,W    ; Local buffer error bit counters
V      <M

```

```

LBUF_NAVL...M      ; Local buffer unavl SNAK set rsn 8
LBUF_SML...M      ; Local bfr too small SNAK set rsn 16
>
F LBE,B           ; Local buffer error
F RBE1YP,W        ; NMA definition for the field
F RBEBC,W         ; Remote buffer error bit counters
V <M
RBUF_NAVL...M     ; Remote buffer unavl NAK RCV'd rsn 8
RBUF_SML...M     ; Remote bfr too small NAK RCV'd rsn 16
>
F RBE,B           ; Remote buffer error
F STOTYP,W        ; NMA definition for field
F STOBC,W         ; Selection timeout bit counters
V <M
NOREP_SEL...M    ; When no attempt to respond was made
INCRP_SEL...M    ; When attempt is made but the timeout
                  ; still occurs
>
F STO,B           ; Selection timeout
F LRTOTYP,W       ; NMA definition for field
F LRTO,B          ; Records setting of SREP
F RRTOTYP,W       ; NMA definition for field
F RRTO,B          ; Records setting SACK when REP RCV'd
                  ; with NUMB = R
L ERREND          ; End of error counters
F THRES,W         ; Threshold errors
                  ; Bits 0-2 RCV threshold errors
                  ; Bits 3-5 XMT threshold errors
                  ; Bits 6-8 Selection threshold errors
                  ; Reserved
F .B
L LENGTH
E

```

```

$STRUCT GF
F     STATE,B           : State of protocol
F     TIMER_STATE,B    : State of DDCMP timer
V     <M
      TIMER_RUNNING,..M : Timer is currently running = 1
      >                  : Timer stopped = 0
F     DRVCHR,B         : Device characteristics
V     <M
      CRC,..M          : 0 = Device does CRC checking
      >
F     SELWAI,W         : Amount of time to wait before timing
                          : the selection interval out
F     NEXTCNT,W        : Count on which interval the station
                          : will deselect itself in trib mode
F     MAXSEL,B         : Max number of selection intervals
F     CURSEL,B         : Current number of selection intervals
F     FIPL,B           : Fork IPL of driver
F     DIPL,B           : Device IPL from driver
F     GEB,W            : Size of global counter block
F     SELEND,L         : Time the selection int expires
F     TOE_STS,L        : Return status of timeout
F     STRTIM,B         : Amount of time to wait before setting
                          : station streaming flag
F     BABTIM,B         : Amount of time to wait before setting
                          : station babbling flag
F     STRTMR,L         : Stream timer
F     BABTMR,L         : Babbling timer

: Station error counters
L     ERRSRT           : Start of error counters
F     LSETYP,W         : NMA definition for the field
F     LSE_BCIRS,W      : Local station errors bit counters
V     <M
      LRCV_OVR,..M     : Receive overrun SNAK set reason 9
      LNRCV_OVR,..M    : Receive overrun SNAK not set
      LXMT_UNDR,..M    : XMT underrun
      LMSGADR_FMT,..M  : NAK RCV'd reason code 17
      >
F     LSE,B           : Local station errors
F     RSETYP,W        : NMA definition for the field
F     RSE_BCIRS,W     : Remote station errors bit counters
V     <M
      RRCV_OVR,..M     : NAK's RCV'd reason code 9
      RMHDR_FMT,..M    : SNAK set reason code 17
      SADR_ERR,..M     : Message RCV'd by an unselected trib
      STR_TRIB,..M     : Streaming trib
      >
F     RSE,B           : Remote station errors
L     ERREND           : End of error block
F     GH_CRC,B         : Global header CRC error
F     MDF_CRC,B        : Maintenance data field CRC error
F     STRYSEL,B        : Maximum selection timeouts on startup
L     LENGTH           : GF block length

```

E

The following definitions are commands used to interface the driver and the protocol

```

$STRUCT DLK
C
  < 1,1
  RCVMSG          : Message was received
  XMTMSG          : Message to transmit
  REQEBA         : User requests a trib's error block
  USRINT         : User initiated commands
  CHAR           : Set up line characteristics
  START_TIMER    : Start up DDCMP timer
  STOP_TIMER     : Stop DDCMP timer
  RETINFO        : Return action status to driver
  ACTNOTCOM      : Action that the driver requested
                  : of the protocol could not be
                  : completed
>

```

The following are bit definitions for each code associated with the various commands.

```

*****
INTERFACE DDCMP TO DRIVER
*****

```

Bit codes for DLKSC_RETINFO

```

V
<M
  TRNSERR...M      : Transient error threshold overflow
  PRSTERR...M      : Persistent errors
  REINT...M        : Reinitialize the protocol
  HDRERR...M       : Error in header
  XMTERR...M       : The data msg to XMT contained no data
  OFULERR...M      : The XMTQ is full >127 outstanding msg
  STRTRCV...M      : The protocol RCV'd a START while in
  MNTRCV...M       : Maint msg rcvd while in HLT or RUN
                   : RUN state
  RCVACK...M       : A receive message was acknowledged
  XMTACK...M       : A transmit message was ACK'd
  XMTCMP...M       : An XMT is done and ready to post
  SNSYN...M        : 0 = send lng sync 1 = send short sync
  ENTMAINT...M     : The protocol has entered maint mode
  ERROR...M        : Address of error block requested
                   : from trib
  TRNLK...M        : Inform driver to stop RCVing and
                   : start XMTing
  TMREXPD...M      : Set if TOE STS when the DDCMP timer
                   : has expired. For half duplex and
                   : multipoint the msg must be send .
  CRC...M          : Receive buffer CRC error do not comp

```

```

>
: Bit codes for DLKSC_ACTNOTCOM
:
: V      <M
: BADSTATE...M      : Protocol was in the wrong state
:                   : for action
: BADACTION...M     : Action was ambiguous
: CMDERR...M        : Command was not recognized or
:                   : expected
: RCVERR...M        : Rcv msg contained a code which was
:                   : not recognized by the protocol
: .27               : reserved
: >
:
: *****
: INTERFACE DRIVER TO DDCMP
: *****
:
: Bit codes for DLKSC_RCVMSG
:
: V      <M
: LNKLOST...M       : Link was lost
: HDRCRC...M        : Header CRC error
: DATACRC...M       : Data CRC error, hdr CRC was ok
: BUNAVL...M        : Buffer was not available
: BUFTOSML...M     : RCV buffer was too small
: RCVOVR...M        : RCV overrun
: PADBYTE...M       : No PAD byte on a RCV msg
: .26               : reserved
: >
:
: Bit codes for DLKSC_XMTMSG
:
: V      <M
: MSGSENT...M       : Message has been XMT'd it may need
:                   : to be reply timed out
: QEMPTY...M        : Indicate to driver the XMTQ is empty
: .30               : reserved
: >
:
: Bit codes for DLKSC_REQEBA interface driver to DDCMP
:
: V      <M
: CLEAR...M         : Read and clear the counters
: TRIB...M          : Return trib counters
: GLOB...M          : Return global counters
: .28               : Reserved
: >
:
: Bit codes for DLKSC_USRINT interface driver to DDCMP
:

```

```

V      <M
      START...M      ; Start protocol
      STOP...M       ; Stop protocol
      MAINT...M      ; Enter maintenance message
      ,29
      >

```

```

: Bit codes for DLKSC_CHAR interface driver to DDCMP
:

```

```

V      <M
      STATYP...M     ; 0 = control          1 = tributary
      POINT...M      ; 0 = point to point   1 = multipoint
      DUPLEX...M     ; 0 = full duplex     1 = half duplex
      LNTYP...M      ; 0 = device does crc 1 = device does no crc
      MSGCNT...M     ; If set user set msgs/selection intvl
      SELTIM...M     ; If set user set # of selection intvl
      SELWAIT...M    ; If set user set selection intvl wait
      REPTIM...M     ; If set user set # of reply T/O
      REPWAIT...M    ; If set user set reply T/O tries
      STREAM...M     ; If set user set streaming time
      BABBLE...M     ; If set user set babbling time
      SETDEF...M     ; Set default DDCMP values
      >

```

```

: Struct of parameter buffer

```

```

F      TRIB,B        ; Trib address
F      MSGCNT,B      ; Number of msgs to send / selection
F      MAXREP,B      ; Number of retries on reply T/O
F      MAXSEL,B      ; Number of retries on select T/O
F      REPWAIT,W     ; Reply timer wait field
F      SELWAIT,W     ; Select timer wait field
F      MAINT,B       ; Maintenance mode
F      MRB,B         ; Maxium receive buffers
F      .B.2         ; Two spare bytes

```

```

E

```

```

: The following definitions are the buffer definitions used to pass
: necessary driver address to the protocol.
:

```

```

$STRUCT DLA

```

```

F      XMT_INPR,A    ; Address of the drivers xmt inprogress
F      POSTQ,A      ; Address of the drivers post queue
L      ADDR_LENGTH
E

```

