EOT   (m)

The MPC-80 sends the ER Identifier along with an error string (unknown variable).

2.4.5 DD   DOWNLOAD DATA

The Download Data command can be used to load machine setup parameters from the Host to the MPC-80.
The machine setup parameters are stored as a set of variables, eg. each variable is stored as NAME DATA.

The Download Data sequence can be initiated by the host or can be requested by MPC-80.

1. Download Data initiated by the Host:

Switch S2 on the handswitchbox must be set to Manual
Switch S3 on the handswitchbox must be set to Set Up
Mould number must be entered. (page 5)
Keyswitch on the keyboard panel in position 6
1 must be entered on page 5 line "DOWNLOAD DATA"
The Host must monitor the upload/download flag of the machine status byte to know if the MPC-80 is ready to accept data from the Host. If the MPC-80 is nor ready and the Host tries to download without reading the machine status byte a NOT READY echo command would be sent by the MPC, and communication would be ended y the transmission of an EOT.
The MPC-80 will Display a Message "DOWNLOAD DATA RE-QUESTED" on the screen. This Message will be canceled by the successfully ended data download process or by the operator. (refer example)

2. Download Data initiated by the Operator:

The same operating procedure must be performed as in the above description unless that the Host has to monitor the machine status byte and when the machine is ready automatically has to start the download process.

DD CRLF   (h)
ER NR CRLF   (m)
EOT   (m)

MPC-80 reports being not ready for receiving programdata

```
DD  CRLF'                (h)
DD  CRLF'                (m)
CUMNS_   1234567890 CRLF
WOB1SS  1400 CRLF
WOBNSS  3.5 100 1000 00 00 00 CRLF
WOBNSV  10 80 40 00 00 00 CRLF
EOT                      (h)
     HOST sends program data
```

2.4.6 UD   UPLOAD DATA

The upload Data command can be used to load machine setup parameters from the MPC-80 to the Host. The machine setup parameters are stored as a set

The Upload Data sequence can be initiated by the host or can be requested by MPC-80.

1. Upload Data initiated by the Host:

   Mould number must be entered. (page 5)
   Keyswitch on the keyboard panel in position 6
   1 must be entered on page 5 line "UPLOAD DATA"
   The Host must monitor the upload/download flag of the machine status byte to know if the MPC-80 is ready to send data to the Host. If the MPC-80 is not ready and the Host tries to upload without reading the machine status byte a NOT READY echo command would be sent by the MPC, and communication would be ended by the transmission of an EOT.
   The MPC-80 will Display the Message "UPLOAD DATA REQUESTED" on the screen. This Message will be canceled by the successfully ended data upload process or by the operator. (refer example)

2. Upload Data initiated by the Operator:

   The same operating procedure must be performed as in the above description unless that the Host has to monitor the machine status byte and when the machine is ready automatically has to start the upload process .

UPLOAD DATA

```
UD CRLF              (h)
UD CRLF              (m)
CUMNS  1234567890 CRLF
WOB1SS 1400 CRLF
WOBNSS 3.5 100 1000 00 00 00 CRLF
WOBNSV 10 80 40 00 00 00 CRLF
EOT                  (m)
```

   MPC-80 send Set Up Parameters to HOST

2.4.7 EB   TRANSMIT ERROR BUFFER

The Error Buffer contains the sampled error messages of max 25 risen error messages, each message in clear text along with time of rising and time of canceling or disappearance and the actual value of total production data. (cycle counter)
The Format of the information is as follows:

        Error number, time of raise, Cycle counter,
        Time of cancel, Message in clear text (max. 3 lines of text)

The information of each error occurred is transferred to the host upon his request.
the information consists of 2 ... 4 data strings.
The first String contains data information Following strings hold the clear text error message.

When the host has successfully received all information from the buffer then the Information will be canceled out of the Buffer.
New information from next errors raising will be stored automatically into the buffer.

TRANSMIT ERROR BUFFER

```
EB  CRLF        (h)
EB  CRLF        (m)
A3  15.38.10  253  *  HEATER BAND / FUSE DEFECTIVE ZONE
                          NR  7  LF  CRLF
EOT            (m)
```

        MPC-80 reports   time, cycle counter,
                          time of cancel or * (= still pen-
                                                    ding)
                          error message

2.4.8 LC   TRANSMIT LAST CYCLE BUFFER

Representative Data of the last 40 cycles are stored in a Buffer (see MPC Page 70 & 71).

These Data are:
Cycle time, injection time, plasticizing time, start injection stroke, cushion, pressures at the end of each injection step, strokes at the end of each holdpressure step, temperature of zone No 1 and 2, and part number.
This information is stored in the Last Cycles Buffer.
Upon request of the Host this information can be transferred.
When the host has successfully received all information of the buffer, then the Information will be canceled out of the Buffer, thus freeing the host from keeping track of each individual machine cycle.
New information from next machine cycle is then stored automatically into the buffer.

```
TRANSMIT LAST CYCLE BUFFER
CB   CRLF            (h)
CB   CRLF    -       (m)
POZAIN 325 CRLF
LCCTAt 15.3 15.3 15.4 15.3 CRLF
LCITAt 4.6 4.6 4.6 4.7 CRLF
LCPTAt 8.0 7.9 8.0 8.0 CRLF
LCZ1AT 110 110 110 110 CRLF
LCZ2AT 120 120 120 120 CRLF
LCISAs  40 42 43 43 mm CRLF
LCIEAs  44 44 44 45 mm CRLF
LCHSAR  46 46 47 46 bar CRLF
LCIPAp  50 51 40 49 bar CRLF
LCHPAp  75 78 76 76 bar CRLF
LCBPAp  120 124 123 124 bar CRLF
LCINAp 1 30 30 30 30 bar CRLF
LCINAp 2 50 50 50 50 bar CRLF
LCINAp 3 65 65 65 65 bar CRLF
LCINAp 4 75 75 75 75 bar CRLF
LCINAp 5 93 93 93 93 bar CRLF
LCINAp 6 110 110 110 110 bar CRLF
LCINAp 7 125 125 125 125 bar CRLF
LCHPAs 1 12.0 12.1 12.0 12.3 mm CRLF
LCHPAs 2 8.0 8.1 8.0 8.3 mm CRLF
LCHPAs 3 4.0 4.1 4.0 4.3 mm CRLF
EOT
 (m)
```

MPC-80 sends the contents of the Last Cycle Buffer.

For the example the buffer holds data of 4 cycles.
When the buffer has been assessed by the host, it will be
emptied and again refilled with data from next cycles.

2.4.9 CB   TRANSMIT CHANGE OF STATE BUFFER

The change of state buffer holds information of data which
has been altered through the keyboard by the operator of
through the communications line by the Host.
This Function is continuously active.
Following information are stored in the change of state
buffer:

    Time of change in hours, minutes, seconds
    Cycle number
    Old data
    New data

When the buffer has been assessed by the host, if will be
emptied. The Buffer will be refilled with data at next
events.

TRANSMIT CHANGE OF STATE BUFFER

CB   CRLF   (h)
CB   CRLF   (m)
15.50.22 1430 MOSPSv 85 mm/sec -> 90 mm/sec CRLF   (m)
EOT   (m)

2.4.10 DM DOWNLOAD MESSAGE

This command allows the Host to transmit any kind of information to the MPC-80. This information is then displayed on the screen of the MPC-80 on page 7 and 8. When the Host sends an information the MPC-80 will display the message:
"READ INFORMATION ON PAGE 7, 8" in the fault message field.

DOWNLOAD MESSAGE


```
DM""CRLF          (h)
DM  CRLF          (m)
ANY KIND OF TEXT MAY BE TRANSFERRED. CRLF     (h)
THE LENGTH MAY BE 30 LINES. CRLF              (h)
A LINE MAY NOT BE LONGER THAN 64 CHAR. CRLF   (h)
EOT          (h)
```

2.4.11 ST   SET TRACE INSTRUCTION REGISTER

With this command the host can download a set of variables
names (max.25). The MPC samples data at the end of each
cycle according to the set of variable names.
This data will be collected in the Trace Buffer and can be
read out of the buffer by the HOST using the TB command.
Each time the buffer is read out by the HOST, the contents
of the buffer is canceled out.

FORMAT OF THE COMMAND:
ST CRLF   (h)
ST CRLF   (m)
name name name .... name CRLF   (h)
EOD   (h)

2.4.12 TB   TRANSMIT TRACE BUFFER

This command can be used to get data out of the MPC
instead of using Block transfer. Prior of using the TB
Command the Trace Instruction Register must be set up.
This is done by using the ST command thus setting up the
variables to be collected each cycle.
The data of the set of variables are then stored into a
buffer and can be read of the buffer by the host. Each
time the data is read out by the HOST, the contents of the
buffer is canceled out.

FORMAT OF THE COMMAND:

TB CRLF   (h)
TB CRLF   (m)
data data data .... data CRLF   (m)
data data .... data CRLF   (m)
EOT   (m)

2.4.13 <u>IT   INTERRUPT from MPC to host   (OPTION)</u>
        (not included in standard programs)

The IT command is used to send events to the HOST where an immediate reaction of the HOST is desired. The HOST must currently test the input for the presence of an IT command from the MPC-80.

The interrupt from the MPC comes up:

- when an error condition occurs in the MPC
- when an end of batch has been detected (ref. also robot interface)
- when the operator has requested upload data or
- download data.

Format of the IT command
- similar to MS command

```
IT 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 CRLF    (m)
EOT            (m)
```

1. word Error Buffer Status 0=empty 1=data pending
2. word Change of State Buffer Status   "
3. word Last Cycle Buffer Status   -   "
4. word Up/Download Request 0=no 1=upload 2=download
5. word End of Batch   0=not reached   1=reached
6. word Trace Buffer   0=empty 1=data pending
7. word Safety Gate 0=closed and tested 1=closed
                            2=closing
                            3=opening 4=open 5=Tapeswich or S31
                            6=undefined position
8. word Mold   0=closed and clamp pressure 1=closed
                            2=opening 3=open 4=closing
                            5=cooling time 6=undef.position
9. word Carriage   0=back   1=moving forward   2=is
   forward   3=moving backward 4=undef.position
10. word Injection   0=plasticised 1=injection
                            2=hold pressure 3=plasticising
                            4=suckback 5=no funktion
11. word Ejector   0=back 1=mov.forward 2=is forward
                            3=mov. backward 4=undef.position
12. word Core 1   0=not present 1=setting 2=is set
                            3=pulling 4=is pulled 5=undef.pos.
13. word Core 2
14. word Core 3
15. word Core 4
16. word Mode   0=undefined 1=Setup 2=manualy
                            3=semi-automatic 4=automatic

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6=cycle stop 7=mold change

This 16 words of Information are transferred to the host as a 32 bytes ASCII character string containing hexadecimal digits 0 ....F.

3. ERROR MESSAGES

All Handshaking between HOST and MPC is done with the ACK and NACK and XON - XOFF Control Characters.
Therefore all transmission errors messaging due to a bad communications line with signal disturbances is done with control characters.

If a syntax error within a command string has occurred or a unknown argument has been used in a command string the MPC-80 will issue an Error Echo instead of the Echo command.
The general signalflow of an Error Echo is as follows:

(COMMANDSTRING)   (h)   ; command cannot be fully
                                  ; interpreted by the MPC
(ERRORECHO)   (m)   ; The ERRORECHO is sent and
                                  ; the Telgramm must be   -
                                  ; aborted.

Each time the HOST has sent a Command string it must wait for the Echocommand string, sent by the MPC-80.
The Echocommand string consists of the echoed identifier characters either along with a blank and CRLF or a Blank, Data and CRLF.

3.1 SYNTAX OF THE ERRORECHO

An ERRORECHO is instead of an echoed identifier a String of "ER" - characters, Blank, 2 character error string and CRLF.

EXAMPLE OF AN ERROR:

    The example shows, how the MPC-80 answers, if
    a variable has been accessed which is not available.

TV WxB1SS 1400.0 mm CRLF   (h)   Host writes a Variable
ER V?   CRLF   (m)
EOT   (m)

The MPC-80 sends the ER Identifier along with an error string (unknown variable)

3.2   LIST OF ERROR STRINGS

STRING	EXPLANATION
I?	unknown identifier
V?	unknown variable
VL	received value is too low
VH	received value is too high
L?	line does not exist
P?	page does not exist
IE	syntax error
NR	MPC not ready for download
CE	change of state buffer is empty
EE	error buffer is empty
UU	no access allowed - unknown user
LE	last cycle buffer empty
IN	identifier unknown
OV	cannot write to output variable
DE	unknown field element - dimension error
TE	trace buffer empty

---END

ACTUAL MOLD POSITION - CLAMPING UNIT .... ACTL 154.2 mm
                                                    CUMPAs

   SETP. 0 MM START CARRIAGE FORW.AFTER CLAMP FORCE IS BUILD UP
1 START CARRIAGE FORWARD ...... SET   10.0 mm
                                      CAFSSs

   (BEFORE MOLD IS CLOSED)
2 CARRIAGE FORWARD DELAY ...... SET   0.0 sec ACTL   0.0 sec
                                      CAFDSt   CAFDAt

3 CARRIAGE FORWARD LIMIT SWITCH SET   10.0 mm   ACTL   1.7 mm
                                      CAFLSs   CAF2s

4 CARRIAGE RETURN DELAY .... SET   0.0 sec ACTL   0.0 sec
                                      CARDSt   CARDAt

5 CARRIAGE RETURN LIMIT SWITCH SET   50.0 mm
                                      CARLSs

6 MAX CARRIAGESTROKE/SILO-FUNC. SET   0.0 mm
                                      CARLSs.02.00

INJECTION UNIT DIM.MM/SEC, BAR (HYDR.PR.) = 0

1   CCM/S., BAR (MASS PR.) = 1 ACTL   0
                                                            INDMS__

2 PLAST. STOP POINT   600.0 mm SET   120.0 mm ACTL   120.4 mm
                         PLMXAs   PLPSSs   IUSPAs

3 SCREW DRIVE SPEED   100 rpm SET   80 rpm ACTL   0 rpm
                         PLMXKn   PLSPSn   PLSPAn

4 SCREW DRIVE SPEED BY OPENING   SET   50 rpm
                                         PLSPSn.02.00

5 BACKPRESSURE .... SET   20 bar ACTL   6 bar
                                         PLBPSp   INPRAp

6 PLASTICIZER DELAY .... SET   1.0 sec ACTL   0.0 sec
                                         PLPDSt   PLPDAt

7 VENTED BARREL AD.FEEDING TIME SET   0.0 sec ACTL   0.0 sec
                                         PLVBSt   PLVBAt

  SUCK BACK PROGRAM OFF = 0
8 BEFORE=1/AFTER PLASTICIZING=2 SET   0
                                         PLSPS_

9 SUCK BACK STOPPOINTSTROKE ... SET   0.0 mm
                                         PLSDSs

10 SCREW SUCK BACK SPEED .... SET   0 mm/sec
                                         PLSDSv

11 NOZZLE CLOSING DELAY .... SET   1.0 sec ACTL   0.0 sec
                                         PLCDSt   PLCDAt

12 BACKPRESS. LOCKOUT OFF=0/ON=1 SET   0
                                         PLBPS_
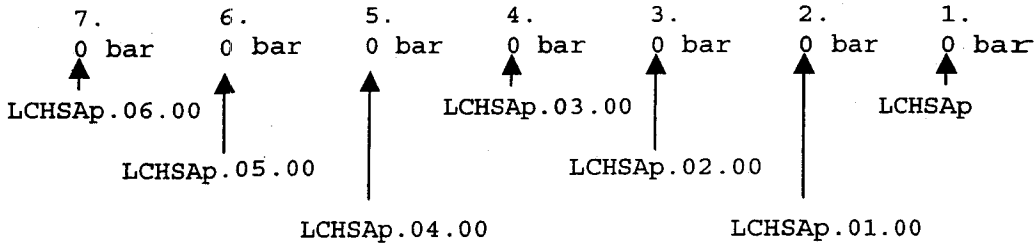
1 PLAST. STOP POINT   600.0 mm   SET   120.0 mm ACTL   120.4 mm
                       PLMXAs   PLPSSs   IUSPAs

2 INJECTION PRESSURE MAX ...... SET   0 bar ACTL   0 bar
                                        INPMSp   LCI2Ap

  CRITERIA 1-4=0/POS=1 / TIME=2 / HYDR.PRESS=3 / MOLD PRESS.=4
3 SWITCH OVER TO HOLD PRESSURE SET   1   ACTL   0
                                       INSCS_   INSCA_

4 HOLD PRESSURE MONITORING   OFF =0 / ON =1   ACTL   0
                                                         INPDS_

5 CRITERIA   POSITION .... SET   5.0 mm ACTL   0.0 mm
                                      IN1SSs.06.00   INSHAs

6 CRITERIA   TIME .... SET   0.0 sec ACTL   0.0 sec
                                      INCRSt   INITAt

7 CRITERIA   HYDR.PRESS. .... SET   0 bar ACTL   0 bar
                                      INCRSp   INCRAp

8 CRITERIA   MOLD PRESSURE ..... SET   0 bar ACTL   0 bar
                                      INMPSp   LCMSAp

9 RELEASE BY HYDR.PRESS.S.OVER SET   0.0 mm
                                      INPRSs

  INJECTION TIME .... ACTL   0.0 sec
                                                     INTIAt

10 COOLING TIME .... SET   10.0 sec ACTL   0.0 sec
                                      IUCTSt   IUCTAt

11 NOZZLE VALVE PROGRAM AUTOMATIC = 0 / OPEN = 1 ACTL   0
                                                        IUNPS_

12 NOZZLE CLOSING DELAY .... SET   5.0 sec ACTL   0.0 sec
                                      IUCDSt   IUCDAt

```
   1  PLAST.STOP POINT  SET    120.0 mm      ACTL   120.4 mm
                                PLPSSs               IUSPAs

 2- 3  1.STEP-INJECTION STROKE 110.0 mm   1.SPEED     50 mm/sec
                                IN1SSs               IN1SSv

 4- 5  2.STEP-INJECTION STROKE 100.0 mm   2.SPEED     65 mm/sec
                                IN1SSs.01.00         IN1SSv.01.00

 6- 7  3.STEP-INJECTION STROKE  90.0 mm   3.SPEED     65 mm/sec
                                IN1SSs.02.00         IN1SSv.02.00

 8- 9  4.STEP-INJECTION STROKE  80.0 mm   4.SPEED     65 mm/sec
                                IN1SSs.03.00         IN1SSv.03.00

10-11  5.STEP-INJECTION STROKE  70.0 mm   5.SPEED     65 mm/sec
                                IN1SSs.04.00         IN1SSv.04.00

12-13  6.STEP-INJECTION STROKE  60.0 mm   6.SPEED     35 mm/sec
                                IN1SSs.05.00         IN1SSv.05.00

14-15  7.STEP-INJECTION STROKE   5.0 mm   7.SPEED     25 mm/sec
                                IN1SSs.06.00         IN1SSv.06.00

16-17  1.HOLD PRESS.TIME SET     1.0 sec  1.PRES.     50 bar
                                IN1PSt               IN1PSp

18-19  2.HOLD PRESS.TIME SET     2.0 sec  2.PRES.     45 bar
                                IN1PSt.01.00         IN1PSp.01.00

20-21  3.HOLD PRESS.TIME SET     2.0 sec  3.PRES.     40 bar
                                IN1PSt.02.00         IN1PSp.02.00

22-23  4.HOLD PRESS.TIME SET     5.0 sec  4.PRES.     25 bar
                                IN1PSt.03.00         IN1PSp.03.00

       TOTAL HOLDPR.TIME ACTL   10.0 sec  PRESS.       6 bar
                                IN1Pat               INPRAp
```

```
   7.        6.        5.        4.        3.        2.        1.
   0 bar     0 bar     0 bar     0 bar     0 bar     0 bar     0 bar
   ▲         ▲         ▲         ▲         ▲         ▲         ▲
LCHSAp.06.00        LCHSAp.03.00                   LCHSAp

      LCHSAp.05.00           LCHSAp.02.00

            LCHSAp.04.00                 LCHSAp.01.00
```

ACTUAL SCREW POSITION .... ACTL 120.4 mm
                                                  IUSPAs

1 DRY CYCLE .. .. OFF =0 / ON =1 SET   0
                                           GODCS_

2 START INJ.WITH CLAMP.FORCE .. SET   50 %   ACTL   675 kn
                                           IUSPSp   MCCFAp

3 INTRUSION OFF = 0 / ON = 1   SET   0
                                           PLINS_

4 INTRUSIONS - TIME .... SET   0.0 sec ACTL   0.0 sec
                                          PLINSt   PLINAt

5 SCREW DRIVE SPEED   100 rpm SET   0 rpm ACTL   0 rpm
                         PLMXKn   PLSPSn.01.00   PLSPAn

```
;----------------------------------------------------------------
; Config file for HOST.EXE
;--------------------------------------------+-------------------

COM1:                          ; Serial port (PC)
9600,o,7,1,cs0,ds0             ; boud,parity,no of bits,no of stopbits
                          ; (cs0,ds0 = without handshake)
c:\windows\notepad.exe         ; editor
```

Host   : <XON>
Machine: <ACK>
Host   : <STX>TV CUMNS_ <CR><LF>FD19<ETX>
Machine: <ACK><STX>TV CUMNS_   72537<CR><LF>FB71<ETX>
Host   : <ACK>
Machine: <EOT>
Host   : <ACK>

;Set trace instruction register

;------------------------------

```
POTPAq                          ; production counter
CYTIAt                          ; cycle time              (sec)
INITAt                          ; injection time          (sec)
LCS2As                          ; start of injection      (mm)
LCHSAp                  ; 1st injection pressure      (bar)
LCHSAp.01.00                    ; 2nd injection pressure     (bar)
LCHSAp.02.00                    ; 3rd injection pressure     (bar)
LCHSAp.03.00                    ; 4th injection pressure     (bar)
LCHSAp.04.00                    ; 5th injection pressure     (bar)
LCHSAp.05.00                    ; 6th injection pressure     (bar)
LCHSAp.06.00                    ; 7th injection pressure     (bar)
INSHAs                  ; end of injection        (mm)
INITAt                  ; injection time          (sec)
INCRAp                          ; hydr.press with start holding (bar)
LCIHAs3                 ; 1st hold pressure stroke    (mm)
LCIHAs3.01.00                   ; 2nd hold pressure stroke    (mm)
INCNAs                          ; position end of holding     (mm)
IUCTSt                  ; cooling time            (sec)
PLPTAt                          ; plastisizing time       (sec)
MCCIAt                          ; mold closing time       (sec)
MOCCAt                          ; mold opening time       (sec)
[]
```

Inhalte der ZIP-Dateien:

Examples.zip:
Host.doc   - Beschreibung des MPC-Hostprogramms
InjectionPages - Seite 30 - 34 mit Variablennamen

Example.ud   - Protokolldatei Upload Data from Machine
Example.dd   - Protokolldatei Download Data to Machine
Example.ms   - Protokolldatei Transmit Current Machine Status
Example.tv   - Protokolldatei Transmit a Variable
Example.eb   - Protokolldatei Trasmit Error Buffer
Example.cb   - Protokolldatei Trasmit Change of State Buffer
Example.lc- Protokolldatei Trasmit Last Cycle Buffer
Example.tp   ••••   - Protokolldatei Trasmit Page
Example.tl - Protokolldatei Trasmit Line of Page
Example.dm   - Protokolldatei Download Message
Example.st- Protokolldatei Set Trace Instruction Register
Example.tb   - Protokolldatei Transmit Trace Buffer

Host.zip:
Host.exe   - Schnittstellen-Testprogramm (MS-DOS)
Host.cfg   - Konfiguration für Host.exe
Settrb.def - Beispieldatei für Set Trace Instruction Register
Test.txt   - Beispieldatei für Download Message
Protokoll.log   - Wird immer beim Datentransfer neu erzeugt

Contents of ZIP-file:

Examples.zip:
Host.doc   - Description of MPC-Hostprogram
InjectionPages - page 30 - 34 with variable names

Example.ud   - protocol file Upload Data from Machine
Example.dd   - protocol file Download Data to Machine
Example.ms   - protocol file Current Machine Status
Example.tv   - protocol file Transmit a Variable
Example.eb   - protocol file Trasmit Error Buffer
Example.cb   - protocol file Trasmit Change of State Buffer
Example.lc- protocol file Trasmit Last Cycle Buffer
Example.tp   - protocol file Trasmit Page
Example.tl - protocol file Trasmit Line of Page
Example.dm   - protocol file Download Message
Example.st- protocol file Set Trace Instruction Register
Example.tb   - protocol file Transmit Trace Buffer

Host.zip:
Host.exe   - Interface test program (MS-DOS)
Host.cfg   - Configuration for Host.exe
Settrb.def - Sample file for Set Trace Instruction Register
Test.txt   - Sample file for Download Message
Protokoll.log   - file will be generate with data transfer