

Installation procedure for the IBM 3705 emulator.

This procedure is for the installation of the IBM 3705 emulator from scratch. It gives high level instructions and assumes that the reader has full knowledge to install and operate Linux, Hercules390, MVS3.8 and RPi Debian.

It is tested with:

- Linux version 4.19.0-17-amd64 (gcc version 8.3.0)
- Hercules version 3.13
- MVS3.8j (part of TK4- Update 8)
- RPi Debian Buster Lite
- SIMH 3.11-0
- X3270

Software required:

- Comm3705 (for Hercules)
- NCP.SSP volume (for MVS3.8)
- EMU3705 (for RPi)

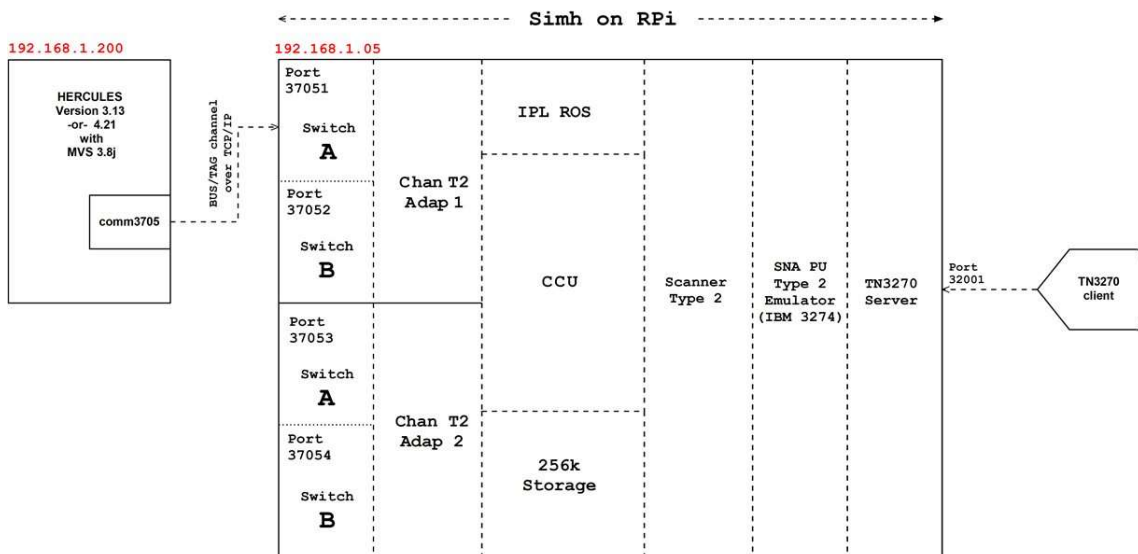
Warning: tk4- is built on Hercules 2012 source and is not supported by EMU3705 and this procedure. We only use the MVS3.8j dasd of tk4-.

Note: in this procedure the Hercules system has IP address **192.168.1.200** and the EMU3705 has IP address **192.168.1.5**

Advice: if you want to deviate from the procedure make small changes, 1 at the time.

Note: during testing we discovered that of quick3270 does not work with the tn3270 server in the EMU3705. X3270 works perfect.

Overview:



Hercules with MVS3.8j [192.168.1.200] and RPi with EMU3705 [192.168.1.5]

1. Preparing Hercules 3.13

Download and unpack a fresh copy of Hercules 3.13:

```
$ wget http://downloads.hercules-390.eu/hercules-3.13.tar.gz
```

```
$ tar -xpvzf hercules-3.13.tar.gz
```

We need the Linux zlib for accessing compressed Hercules dasd files.

```
$ sudo apt-get install zlib1g-dev
```

Make the Hercules directory your current working directory.

```
$ cd Hercules-3.13
```

```
$ ./util/bldlvlck
```

This utility will check the level of various utilities needed to build hercules.

It's output must show all OK's. If not, upgrade the utility in question.

```
$ ./configure
```

```
$ make
```

It may display a lot of warnings, but it will end ok.

Download the EMU3705 package from github <https://github.com/snhstq/IBM3705> and unpack it.

Copy the new version of comm3705.c to the Hercules directory:

```
$ cp EMU3705/Hercules_files/comm3705.c Hercules-3.13/comm3705.c
```

```
cp: overwrite 'comm3705.c'?
```

Enter 'yes'

```
$ cd Hercules-3.13
```

```
$ make
```

2. Preparing MVS

Download TK4-

```
$ wget http://wotho.ethz.ch/tk4-/tk4-_v1.00_update_08.zip
```

Unzip it

```
$ unzip tk4-_v1.00_update_08.zip
```

Copy file 'ncpssp.144' (volume NCPSSP) to 'tk4-/dasd/'

Update file conf/tk4-.cnf and add ncpssp.144 to the dasd configuration.

```
...
0136 2314 dasd/sort06.136
0140 3350 dasd/work00.140
0144 3350 dasd/ncpssp.144      <=== Added
0170 3375 dasd/work01.170
0180 3380 dasd/work02.180
...
```

Update configuration file 'conf/tk4-_default.cnf'

```
#
# NCP VTAM
#
0660 3705 adaptip=192.168.1.05 port=37051 debug=yes      <=== Changed
#0660 3705 lport=${N660PORT:=37051} locncpnm=N07 rmtncpnm=N08 unitsz=252
```

TCPIP port usage:

3705 Chan Adapt	Chan Switch	IP port
1	A position	37051
1	B position	37052
2	A position	37053
2	B position	37054

Tip: set all other 3705 definition statements on comment '#' in this file.

Change to working directory 'tk4-'

Start Hercules 3.13 (**not** the Hercules version delivered with tk4- !)

```
tk4-$ <path to herc-3.13>/hercules -f conf/tk4-.cnf
```

On the Hercules console:

```
==> IPL 148
```

On the MVS master console (unit addr 0010)

```
IEA101A SPECIFY SYSTEM PARAMETERS FOR RELEASE 03.8 .VS2
R 00,U
```

After IPL completion, connect with your preferred TN3270 client to TSO and logon with user-id HERC01 / passw CUL8TR

Select RFE (Option 1 on the main menu)

RFE 3.4

Check that volume NCPSSP contains the 3705 NCP & SSP datasets.

```
NCPSSP=3350-00 CU=3830-02 ----- RFE DSLIST ----- Row 1 of 9
Command ==>                               Scroll ==> CS
S DATA-SET-NAME- VOLUME ALTRK USTRK ORG FRMT % XT LRECL BLKSZ REFDT CREDIT
' SYS1.GEN3705    NCPSSP   300   273 PO  FB  91  1    80  3520 21225 20297
' SYS1.MAC3705    NCPSSP   510   480 PO  FB  94  1    80  3520 21225 20297
' SYS1.NCPLOAD    NCPSSP    20    15 PO  U   75  1 19069 19069 21229 21225
' SYS1.NCPOBJ1    NCPSSP    60    14 PO  FB  23  1    80   400 21225 21225
' SYS1.NCPSAMP    NCPSSP    30     4 PO  FB  13  1    80  3520 21225 21224
' SYS1.NCPSTG1    NCPSSP    60     5 PS  FB   8  1    80   800 21225 21225
' SYS1.OBJ3705    NCPSSP    90    64 PO  FB  71  1    80   400 21225 20297
' SYS1.SSPLIB     NCPSSP    30    17 PO  U   56  1          1024 21228 20297
**END**
```

Catalog the following datasets on volume NCPSSP.

```
SYS1.GEN3705
SYS1.MAC3705
SYS1.NCPLOAD
SYS1.NCPOBJ1
SYS1.OBJ3705
SYS1.SSPLIB
```

RFE 2

Update SYS1.PARMLIB(LINKLST00)

```
SYS1.LINKLIB,
SYS1.PPLIB,
SYS1.CMDLIB,
SYS2.LINKLIB,
SYS2.CMDLIB,
SYS1.PL1LIB,
SYS2.DSSLIB,
SYS1.SSPLIB      <=== Added
```

RFE 2

Update sys1.parmlib(ieaapf00)

```
SYS1.VTAMLIB MVSRES,
SYS1.NCPLOAD NCPSSP,      <=== Added
EXH.EXHLIB PUB012,
EXH.ESPLIB PUB012
```

RFE 2

Update sys1.proclib(net)

```
//NET      PROC
//IEFPROC EXEC PGM=ISTINM01,TIME=1440,REGION=4096K,DPRTY=(14,15)
//VTAMLST DD DSN=SYS1.VTAMLST,DISP=SHR
//VTAMLIB DD DSN=SYS1.VTAMLIB,DISP=SHR
//VTAMOBJ DD DSN=SYS1.VTAMOBJ,DISP=SHR
//NCPLOAD DD DSN=SYS1.NCPLOAD,DISP=SHR      <=== Added
```

RFE 3.3

The IFLOADN used by tk4- is a special version to load fake IBM 3705's.
Restore the original IFLOADRN of IBM.

Copy 'SYS1.SSPLIB(IFLOADRN)' on NCPSSP to 'SYS1.LINKLIB(IFLOADRN)' on MVSRES
with replace existing member option.

Note: the old IFLOADRN version is now not avail anymore.

Shutdown MVS and Re-IPL MVS with these updates.

3. NCP generation

Connect and logon to TSO

RFE 2

Open member 'NCPGEN' in SYS1.NCPSAMP. It contains a sample NCP generation job for an NCP with:

- 1 Channel adaptor type 2
- 1 Scanner type 2
- 1 Half duplex SDLC line
- 1 PU type 2 with
- 1 LU

Note: for full NCP V1 R2 details see:

http://bitsavers.org/pdf/ibm/sna/acf/SC30-3142-0_ACP_NCP_VS_Network_Control_Program_System_Support_Programs_Installation_Rel_2_197502.pdf

Submit this job.

Stage 2 (composed of 14 jobs!) of the NCP generation will now be written to SYS1.NCPSTG1.

Note: the last job wants to allocate SYS1.NCPLOAD with DISP=OLD. SYS1.NCPLOAD is allocated by VTAM, so you need to stop VTAM it to free it. This can be avoided by changing it to DISP=SHR (see job step S15 and below).

```
//S15 EXEC PGM=IEWL,REGION=320K,
//          PARM='LIST,LET,DC,NCAL,XREF,SIZE=(310K,48K) '
//SYSPRINT DD SYSOUT=A
//SYSUT1 DD UNIT=SYSDA,SPACE=(1024,(50,20))
//SYSLMOD DD DSN=SYS1.NCPLOAD,DISP=SHR      <=== Changed from OLD to SHR
//TEMP DD DSN=&PCUTEMP,DISP=(OLD,PASS)
//PCULIB DD DSN=SYS1.OBJ3705,DISP=SHR
//SYSLIB DD DSN=SYS1.NCPOBJ1,DISP=SHR
//SYSLIN DD *
```

Stop all JES2 initiators except one.

Keep one initiator active with C=A

```
$HASP000      INIT  1 INACTIVE ***** C=A
```

Submit SYS1.NCPSTG1

This will submit 14 jobs to JES2.

After completion, check all return codes: rc=00 and rc=04 are ok. SYS1.NCPLOAD will now contain an updated 'HJS3705' and 'HJS3705R'.

Copy 'SYS1.NCPSAMP(HJS3705)' on NCPSSP to 'SYS1.VTAMLST'

Note: delete (if present) 'SYS1.VTAMOBJ(HJS3705)' every time you update HJS3705 in SYS1.VTAMLST.

4. Preparing Raspberry Pi

Download Debian Buster Lite image:

https://downloads.raspberrypi.org/raspbian_lite_armhf/images/raspbian_lite_armhf-2021-05-28/2021-05-07-raspbian-buster-armhf-lite.zip

Write this image to a microSD card of 8Gb or more. Insert it in a RPi 4 and power it on.

Assign a fixed IP address 192.168.1.5 to the RPi in /etc/network/

Download EMU3705 package from github to your RPi,

<https://github.com/snhstq/IBM3705>

Unzipped it.

```
# make i3705
lib paths are: /lib/ /lib/arm-linux-gnueabi/ /opt/vc/lib/ /usr/lib/
/usr/lib/arm-linux-gnueabi/ /usr/lib/arm-linux-gnueabi/libfakeroot/
include paths are: /usr/lib/gcc/arm-linux-gnueabi/8/include
/usr/local/include /usr/lib/gcc/arm-linux-gnueabi/8/include-fixed
/usr/include/arm-linux-gnueabi /usr/include
using libm: /usr/lib/arm-linux-gnueabi/libm.so
using librt: /usr/lib/arm-linux-gnueabi/librt.so
using libpthread: /usr/lib/arm-linux-gnueabi/libpthread.so
/usr/include/pthread.h
using semaphore: /usr/include/semaphore.h
using mman: /usr/include/arm-linux-gnueabi/sys/mman.h
using libdl: /usr/lib/arm-linux-gnueabi/libdl.so /usr/include/dlfcn.h
***
*** i3705 Simulator being built with:
*** - compiler optimizations and no debugging support. GCC Version: 8.3.0.
***
```

This build should end without problems.

Start the 3705 emulator with:

```
# ./BIN/i3705 I3705/3705.cnf
```

```
CA: Main thread 6196 started successfully...
CS2: thread 6197 started successfully...
TEL: thread 6199 started successfully...
PNL: thread 6198 started successfully...
TEL: Using network Address 192.168.1.5 on eth0 for 3270 client connections
ca value is 0x74a005b8
```

```
Reset CCU...
CPU MEMORYSIZE 262144 ...
IBM 3704/3705 simulator V3.11-0
```

```
Reset CCU...
CPU MEMORYSIZE 65536 ...
Loading MaxiROS...
Boot CCU...
```

```
CA : Waiting for channel connections on TCP ports 37051, 37052, 37053, 37054
CA_T2: Activating polling for channel connection requests...
CA: ATTN thread 6200 started successfully...
```

5. Loading NCP

Now we can start loading the NCP

Restart Hercules and...

```
ADX00003E 1:0660: bus 20 failed, retry in 10 sec...
ADX00005D 1:0660: CCW count=0001
ADX00001E 1:0660: socket 20 Transport endpoint is not connected
ADX00003E 1:0660: bus 20 failed, retry in 10 sec...
...
ADX00003I 1:0660: tag connection established on socket 21
ADX00003I 1:0660: bus connection established on socket 20
ADX00008D 1:0660: connections on port 37051; Bus socket: 20, Tag socket: 21
```

...re-ipl MVS. (just to be sure).

```
==> ipl 148
```

Note: comm3705 will always display informational (ADXnnnnI) and error (ADXnnnnE) messages. When debug=yes is specified in the hercules 'conf/tk4-default' file all Debug (ADXnnnD) messages will be displayed too. With standard Hercules command 't+ cua' (e.g. t+ 660) you can activate the CCW trace and 't- cua' will disabled it again.

Check that the 3705 is online:

```
-          d u,,,660,1
IEE450I 09.34.55 UNIT STATUS          FRAME LAST          F          E          1A
UNIT TYPE STATUS  VOLSER VOLSTATE
660  3705 O
```


Load the generated NCP into the IBM 3705

```
-          v net,act,id=hjs3705
STC  439  IST097I  VARY          ACCEPTED
STC  439  IST197I  SAVED CONFIGURATION HJS3705  READ FROM VTAMOBJ
- STC  439  IEC130I  INITEST  DD STATEMENT MISSING
| STC  439  *00 IST272A  370X HJS3705  NO INITIAL TEST-  REPLY U TO BYPASS-
|  OR CANCEL
-          r 00,u
          IEE600I  REPLY TO 00 IS; U
STC  439  IST270I  370X HJS3705  NOW LOADED WITH LOADMOD HJS3705
STC  439  IST093I  HJS3705  ACTIVE
00 STC  439  IST093I  SDLC3274  ACTIVE
```

Connect x3270 to the EMU3705 IP address 192.168.1.5 port 32001.

Note: during testing we discovered that of quick3270 does not work with the tn3270 server in the EMU3705. x3270 works perfect.

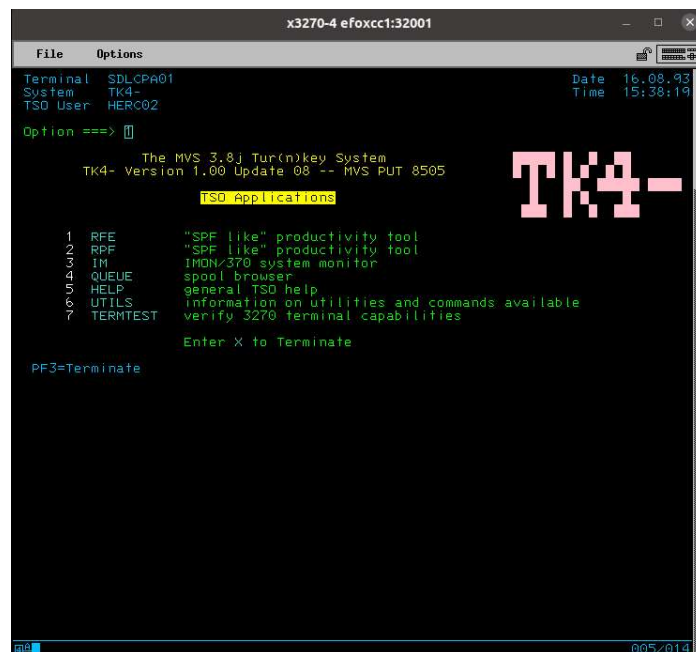
```
...
..
Connected to device 000
```

Press

```
[RESET]
[CLEAR]
[RESET]
```

Type: 'logon applid(tso) logmode(mhp3278e)' and press [SYS-REQ] (not [ENTER])

Take a cup of coffee and wait for the TSO login prompt and login:



== // ==