IBM 3705 EMULATOR

Define, generate and active your own NCP. Connect 3270 terminal emulators or even real IBM equipment to the your 3705 emulator. Includes 3274, 3271 and DLSw emulation.

A SIMH based IBM 3705 emulator for Hercules

Contents

a) IBM 3705 Emulator Release 4: Release notes

The following changes/enhancements are provided with release 4:

1) **BSC support** has been added back in. Release 3 added multi-line support for SDLC lines, causing BSC support to be temporarily dropped. BSC is now back in with multi-line support. This means that an NCP can be generated with a mix of SDLC and BSC lines.
2) **Line Interface Base (LIB) with RS232 emulation:** A LIB in a 3705 is the place where the communication lines are physically connected. The emulator now has a LIB module, to which all lines are connected. The LIB manages the line connections, which are TCP/IP connections, it receives SDLC/BSC frames from a line and passes this byte for byte to the 3705 scanner and receives bytes from the scanner, which are collated to one or more SDLC/BSC frames and then sends these frames across the relevant line.
   The LIB includes RS232 signal emulation. It takes on the role of a Data Communication Equipment (DCE). The RS232 signals are determined by the state of the TCP/IP connection or are set/reset by the scanner. The RS232 signals are important to the behavior of the scanner, which determines a course of action based on the presence or absence of certain signals. In case the scanner wants to transmit data it will raise a Request To Send (RTS, which the LIB sends across the relevant line. The remote side of the line (the remote DCE) will with a Clear To Send (CTS) if the remote PU or Cluster is ready to receive data.
   The LIB comes with a panel, which shows the state of the signals. (Like in the good old day the lights flashing on a modem)
   The functionality of the modules i3705_SDLC and i3705_BSC is integrated in LIB, therefor these two modules have been removed from this release.
3) **DLSw:** A stand-alone module emulating a Data Link Switch (DLSw) is included. This allows real IBM equipment (e.g. 3174 or a PC with SDLC adapter) to be connected to the 3705 emulator. The DLSw module connects at one end to a line of the LIB, the other side connects to a real DLSw router. The emulated DLSw is build according to RFC1795 standard. This includes local handling of Supervisory and Unnumbered SDLC frames as well as handling frame sequence numbers locally. All this reduces the amount of traffic that has to flow between the 2 DLSw's.
4) **Null Modem (NModem).** This is a stand-alone module allowing to interconnect two emulated 3705's. For MVS 3.8 systems this is not yet relevant as VTAM L2 does not support cross-domain connections. Once support for a (emulated) remote 3705 is available, this can be used to connect a channel attached 3705 to a remote 3705. For Higher version of VTAM and NCP this can be used for cross-domain connections, e.g. connect a channel attached 3705 from one host to a channel attached 3705 at another host.
5) **DCE emulation in i3271 and i3274:** The BSC cluster emulation (i3271) and SNA PU T.2 emulation (i3274) include a limited Data Communication Equipment (DCE) function, which handles responses to a Request To Send (RTS) from the 3705 scanner. (See point 2, LIB).
6) **Scanner code rationalized:** With the addition of the LIB, the differences in handling BSc and SDLC could be removed. There is now a single approach yielding performance improvements for SDLC.

b) Installation procedure for the IBM 3705 emulator.

*** NB: Please make sure to read section "Issues and Remarks" ***
Appendix A shows several examples of NCP's.

This procedure is for the installation of the IBM 3705 emulator, Release 2.
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 & version 10.2.1)
- Hercules version 3.13 and most Hyperion releases (version 4.x)
- MVS3.8j CBIPO install and TK4- Update 8 install
- RPi Debian Buster Lite and Bullseye
- SIMH 3.11-0
- X3270

Software required:

- Comm3705 replacement (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 images of TK4-.

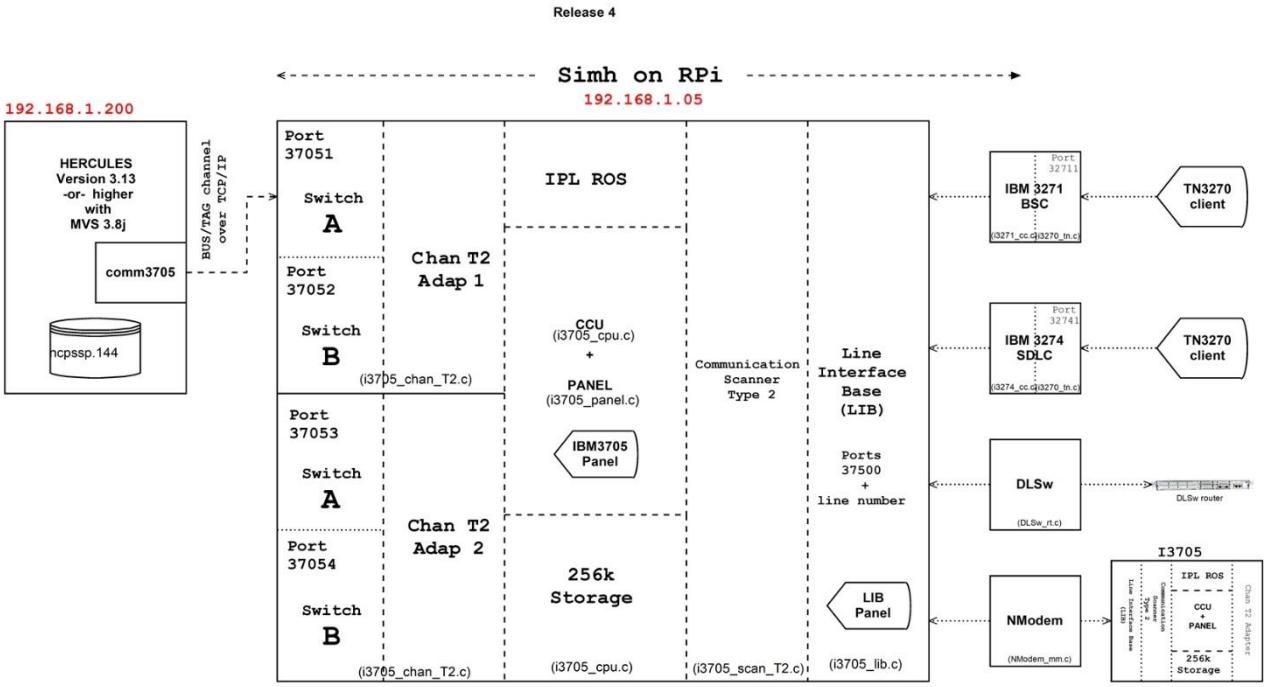
Note: in this procedure the Hercules system has IP address 192.168.1.200 and the EMU3705 has IP address 192.168.1.5

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

Note: during testing we discovered that quick3270 does not work with the tn3270 server in the 3271/3274. X3270 works perfect.

Overview:

Hercules with MVS3.8 [IP: 192.168.1.200] and RPi with EMU3705 [IP: 192.168.1.05]



c) Preparing Hercules 3.13

Note: the 3705 EMU runs on various Hercules/Hyperion releases. Follow the relevant Hercules/Hyperion release "install from source" instructions. All you need to do is replace comm3705.c with our supplied version and build the Hercules/Hyperion executables. Below we use Hercules 3.13 to describe the install.

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.

Next:

```
$ ./configure
$ make
$ make install
```

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
```

That's all folks (I hope).

d) Preparing MVS

Download TK4-

```
$ wget http://wotho.ethz.ch/tk4-/tk4- v1.00 current.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
#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 in this file on comment '#'.

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
```

Connect your TN3270 client as master console to Hercules.

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 CREDT
' 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 (enter C in front of DSN) the following datasets on volume NCPSSP:

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

RFE 2
Update SYS1.PARMLIB(LNKLST00)

```
   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 for loading 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 on.

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

Shutdown MVS and Re-IPL MVS with all these updates.

e) NCP generation

After IPL, 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: **Every time** you update HJS3705 in SYS1.VTAMLST, delete (if present) 'SYS1.VTAMOBJ(HJS3705)'

f) Preparing Raspberry Pi

Download Debian Buster Lite image:
https://downloads.raspberrypi.org/raspios_lite_armhf/images/raspios_lite_armhf-2021-05-28/2021-05-07-raspios-buster-armhf-lite.zip

Write this image to a microSD card of 8Gb or more. Insert it in a RPi 4 (or 3) and power it on.

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

Install additional packages:

```
# apt-get install git gcc make
# apt-get install libncurses-dev
```

Download EMU3705 package from github to your RPi:

```
# git clone https://github.com/snhstq/IBM3705.git
```

(note: this download includes simh)

Unzipped it. Go to working directory 'SIMH files'

Building the IBM 3705:

```
# make i3705
   lib paths are: /lib/ /lib/arm-linux-gnueabihf/ /opt/vc/lib/ /usr/lib/
  /usr/lib/arm-linux-gnueabihf/ /usr/lib/arm-linux-gnueabihf/libfakeroot/
   include paths are:  /usr/lib/gcc/arm-linux-gnueabihf/8/include
  /usr/local/include /usr/lib/gcc/arm-linux-gnueabihf/8/include-fixed
  /usr/include/arm-linux-gnueabihf /usr/include
   using libm: /usr/lib/arm-linux-gnueabihf//libm.so
   using librt: /usr/lib/arm-linux-gnueabihf//librt.so
   using libpthread: /usr/lib/arm-linux-gnueabihf//libpthread.so
  /usr/include/pthread.h
   using semaphore: /usr/include/semaphore.h
   using mman: /usr/include/arm-linux-gnueabihf/sys/mman.h
   using libdl: /usr/lib/arm-linux-gnueabihf//libdl.so /usr/include/dlfcn.h
   ***
   *** i3705 Simulator being built with:
   *** - compiler optimizations and no debugging support. GCC Version: 8.3.0.
   ***
   gcc -std=c99 -U__STRICT_ANSI__  -O2 -finline-functions -fgcse-after-reload
  -fpredictive-commoning -fipa-cp-clone -fno-unsafe-loop-optimizations -fno-
  strict-overflow -Wno-unused-result -I . -D_GNU_SOURCE -DUSE_READER_THREAD -
  DHAVE_SEMAPHORE -DHAVE_SHM_OPEN -DHAVE_DLOPEN=so  I3705/i3705_cpu.c
  I3705/i3705_chan_T2.c I3705/i3705_scan_T2.c I3705/i3705_sys.c
  I3705/i3705_bsc.c I3705/i3705_sdlc.c I3705/i3705_panel.c   scp.c
  sim_console.c sim_fio.c sim_timer.c sim_sock.c sim_tmxr.c sim_ether.c
  sim_tape.c sim_shmem.c -I I3705 -o BIN/i3705 -lm -lrt -lpthread -ldl
  -lncurses
```

This build should end without problems.

Building the IBM 3271:

```
# make i3271
   lib paths are: /lib/ /lib/arm-linux-gnueabihf/ /opt/vc/lib/ /usr/lib/
   /usr/lib/arm-linux-gnueabihf/ /usr/lib/arm-linux-gnueabihf/libfakeroot/
   include paths are:  /usr/lib/gcc/arm-linux-gnueabihf/8/include
   /usr/local/include /usr/lib/gcc/arm-linux-gnueabihf/8/include-fixed
   /usr/include/arm-linux-gnueabihf /usr/include
   using libm: /usr/lib/arm-linux-gnueabihf//libm.so
   using librt: /usr/lib/arm-linux-gnueabihf//librt.so
   using libpthread: /usr/lib/arm-linux-gnueabihf//libpthread.so
   /usr/include/pthread.h
   using semaphore: /usr/include/semaphore.h
   using mman: /usr/include/arm-linux-gnueabihf/sys/mman.h
   using libdl: /usr/lib/arm-linux-gnueabihf//libdl.so /usr/include/dlfcn.h
   ***
   *** i3271 Simulator being built with:
   *** - compiler optimizations and no debugging support. GCC Version: 8.3.0.
   ***
   gcc -std=c99 -U__STRICT_ANSI__ -O2 -finline-functions -fgcse-after-reload -
   fpredictive-commoning -fipa-cp-clone -fno-unsafe-loop-optimizations -fno-
   strict-overflow -Wno-unused-result -I . -D_GNU_SOURCE -DUSE_READER_THREAD -
   DHAVE_SEMAPHORE -DHAVE_SHM_OPEN -DHAVE_DLOPEN=so I327x/i3271_cc.c
   I327x/i3270_tn.c -I I327x -o BIN/i3271 -lm -lrt -lpthread -ldl
```

Building the IBM 3274:

```
# make i3274
   lib paths are: /lib/ /lib/arm-linux-gnueabihf/ /opt/vc/lib/ /usr/lib/
   /usr/lib/arm-linux-gnueabihf/ /usr/lib/arm-linux-gnueabihf/libfakeroot/
   include paths are:  /usr/lib/gcc/arm-linux-gnueabihf/8/include
   /usr/local/include /usr/lib/gcc/arm-linux-gnueabihf/8/include-fixed
   /usr/include/arm-linux-gnueabihf /usr/include
   using libm: /usr/lib/arm-linux-gnueabihf//libm.so
   using librt: /usr/lib/arm-linux-gnueabihf//librt.so
   using libpthread: /usr/lib/arm-linux-gnueabihf//libpthread.so
   /usr/include/pthread.h
   using semaphore: /usr/include/semaphore.h
   using mman: /usr/include/arm-linux-gnueabihf/sys/mman.h
   using libdl: /usr/lib/arm-linux-gnueabihf//libdl.so /usr/include/dlfcn.h
   ***
   *** i3274 Simulator being built with:
   *** - compiler optimizations and no debugging support. GCC Version: 8.3.0.
   ***
   gcc -std=c99 -U__STRICT_ANSI__ -O2 -finline-functions -fgcse-after-reload -
   fpredictive-commoning -fipa-cp-clone -fno-unsafe-loop-optimizations -fno-
   strict-overflow -Wno-unused-result -I . -D_GNU_SOURCE -DUSE_READER_THREAD -
   DHAVE_SEMAPHORE -DHAVE_SHM_OPEN -DHAVE_DLOPEN=so I327x/i3274_cc.c
   I327x/i3270_tn.c -I I327x -o BIN/i3274 -lm -lrt -lpthread -ldl
   make i3271
   gcc -I.   -c -o i327x_3271.o i327x_3271.c
   gcc -o BIN/i327x_3271 i327x_3271.o i327x_3270.o -lrt -lpthread -lm -ldl -
   lbsd
```

Note: the 3274/3271 may be built on a different (RPi) host. Just repeat the above procedure on that host.

Start the 3705 emulator with:

```
#./BIN/i3705 I3705/3705-64k.cnf
```

Note that the cnf file used to start the 3705 EMU (3705-64k.cnf in our example) and is used to define the 3705-memory size. De supplied cnf file specifies in line 1 ”set cpu 64k”. You can change the 64K to any value supported by the 3705 II models A-F (this ranges from 32k-256k). 64K is the only relevant value for the supplied NCP version. If you have access to newer NCP versions you can go up to 256K. (version 3 is the last NCP version to run on a 3705). Sample cnf files are included for 128k (3705-128k.cnf) and 256k (3705-256k.cnf).
After startup the following messages will appear:

```
CS2: Thread 22486 started successfully...
PNL: Thread 22487 started successfully...

CA-T2: Main thread 22485 started successfully...
BSC: Thread 22489 started successfully...
SDLC: Thread 22488 started successfully...


CA: Adapter thread 22484 started successfully...

BSC: Using network Address 192.168.2.71 on eth0 for 3271 connections
SDLC: Using network Address 192.168.2.71 on eth0 for PU connections
CA1: Waiting for channel connection on TCP port 37051
CA2: Waiting for channel connection on TCP port 37053

SDLC: line-0 ready, waiting for connection on TCP port 37520
SDLC: line-1 ready, waiting for connection on TCP port 37521

BSC: line-0 ready, waiting for connection on TCP port 37530
BSC: line-1 ready, waiting for connection on TCP port 37531

CPU: Reset...
CPU: MEMORYSIZE 256K bytes...

IBM 3705 II simulator V3.11-0
CPU: Reset...
CPU: MEMORYSIZE 64K bytes...
CPU: Loading MaxiROS...
CPU: Booting...

CA1: New bus connection on 3705 port 37051, socket fd is 20, ip is :
192.168.2.51, port : 49524

CA1: New tag connection on 3705 port 37051, socket fd is 21, ip is :
192.168.2.51, port : 49528
CA1: Connected to device 0660
```

Now start the 3274 and/or 3271 (we use the 3274 in the description below):

```
$ BIN/i3274 -cchn efoxcc1 -line xx
-or-
$ BIN/i3274 -ccip 192.168.1.05 -line xx
```

xx is the line number, e.g. 20, as defined in the NCP. If omitted, the default is line 20.

The switch -cchn is required to specify the TCPIP hostname of the host that is running the 3705 emulator. The 3274 (or 3271) can run on the same host or a different one. Use the switch -ccip to specify the IP address of the 3705 host. If you specify both -ccip and -cchn, the last one specified will be used.
The following messages will appear:

```
PU2: Connection to be established with 3705 SDLC line at host efoxcc1
PU2: Waiting for SDLC Line xx connection to be established
PU2: SDLC Line xx connection has been established

PU2: Using network Address 192.168.2.71 on eth0 for 3270 connections
PU2: 3274-0 IML ready. TN3270 can connect to port 32741
PU2: 3274-1 IML ready. TN3270 can connect to port 32742
```

The last two messages show that two 3274's have been IML'd. This is the default config. If you do not generate an NCP with two PU's the 2nd PU will be idle and can be ignored (no resources will be used).
Now connect your TN3270 session to the RPi host that is running the 3274 or 3271), The TCPIP port to connect to is 32741 (first PU) or 32742 (2nd PU). For 3271 (BSC) the first cluster TCPIP port is 32711, the 2nd one is 32712. E.g.

```
$ TN3270 192.168.1.xx:32741

  PU2: LU 00 connected to 3274-0
```

The 3270 is now connected to the first PU (defined in the NCP with SDLC 'C1'. The LU 00 means that the 3270 is now the first LU that has been defined for that PU (locaddr 02 in the NCP gen).
If you want to connect to a different LU (e.g. because you want to use a different logmode) you can specify the LU on the TN3270 command:

```
$ TN3270 03@ 192.168.1.xx:32741
```

This connects your TN3270 terminal to the 4th LU that has been defined against the PU in the NCP.

The procedure for BSC (3271) is similar as described above.
To start the 3271:

```
$ BIN/i3271 -cchn efoxcc1  -line xx
-or-
$ BIN/i3271 -ccip 192.168.1.05 -line xx
```

xx is the line number, e.g. 20, as defined in the NCP. If omitted, the default is line 20.

The following messages will appear:

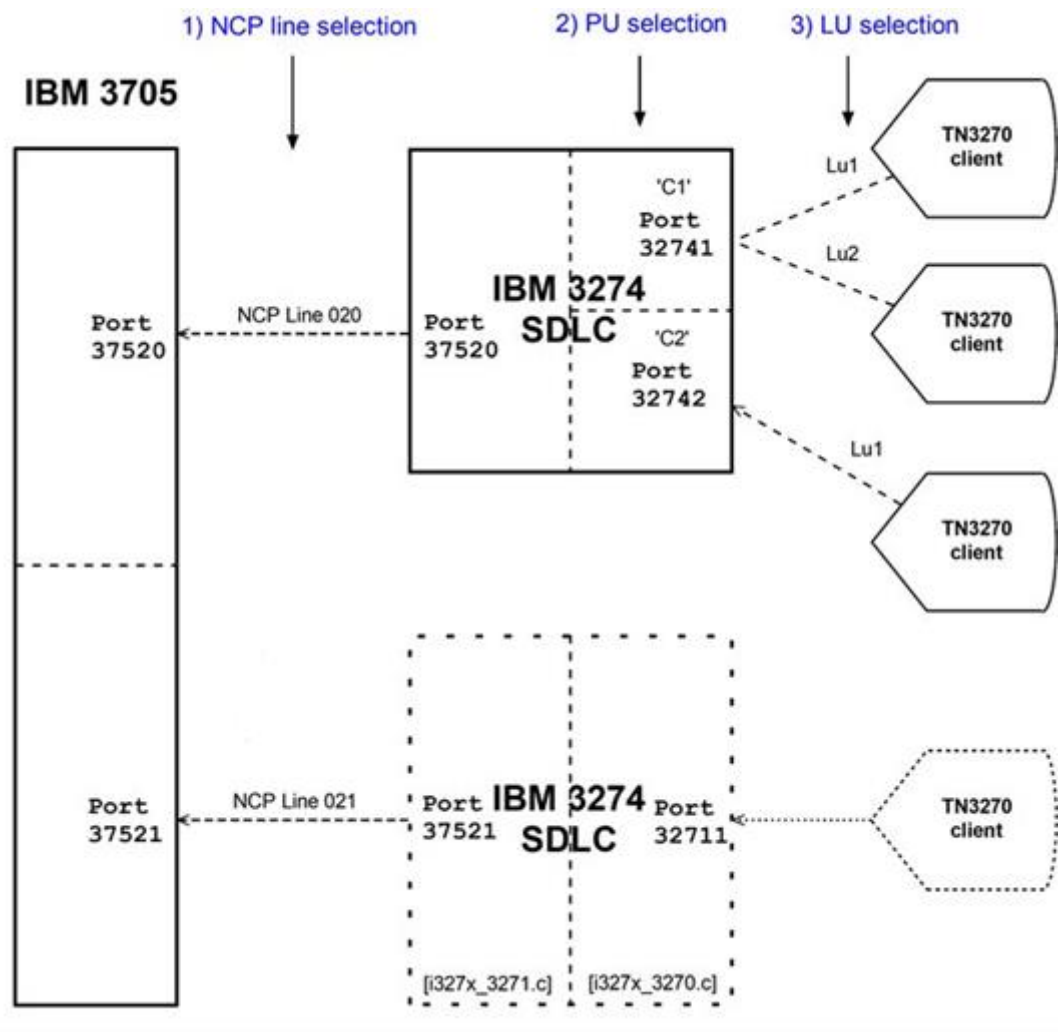
```
CLU: Connection to be established with 3705 BSC line at host efoxcc1
CLU: Waiting for BSC Line  20 connection to be established
CLU: BSC Line 20 connection has been established

CLU: Using network Address 192.168.2.71 on eth0 for 3270 connections
```

```
CLU: 3271-0 IML ready. TN3270 can connect to port 32711
CLU: 3271-1 IML ready. TN3270 can connect to port 32712

Connect to the 3271 with TN3270:
TN3270 192.168.1.yy:32711
```

Summarizing…



1. Connecting 3274 => 3705

   $ BIN/i3274 -ccip 192.168.1.05 -line 20

   When starting the 3274 it will connect with line 020 of the NCP

2. Selecting a PU

   $ TN3270 192.168.1.yy:**32741**

   If you have defined two (or more) PU's on 1 NCP line, each PU gets it own TCPIP port number.
   PU1 – port 32741
   PU2 – port 32742, etc

3. Selecting a LU

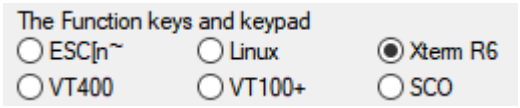
   $ TN3270 **03@**192.168.1.xx:32741

   This connects your TN3270 terminal to the 4th LU that has been defined against the PU in the NCP.

g) 3705 Front Panel

The 3705 front panel can be activated from the terminal that was used to start the 3705 EMU.

Note1: when using Putty make use that you select Xterm R6 keyboard.



Note2: this works only after the 3705 EMU has been booted/ipl-ed.

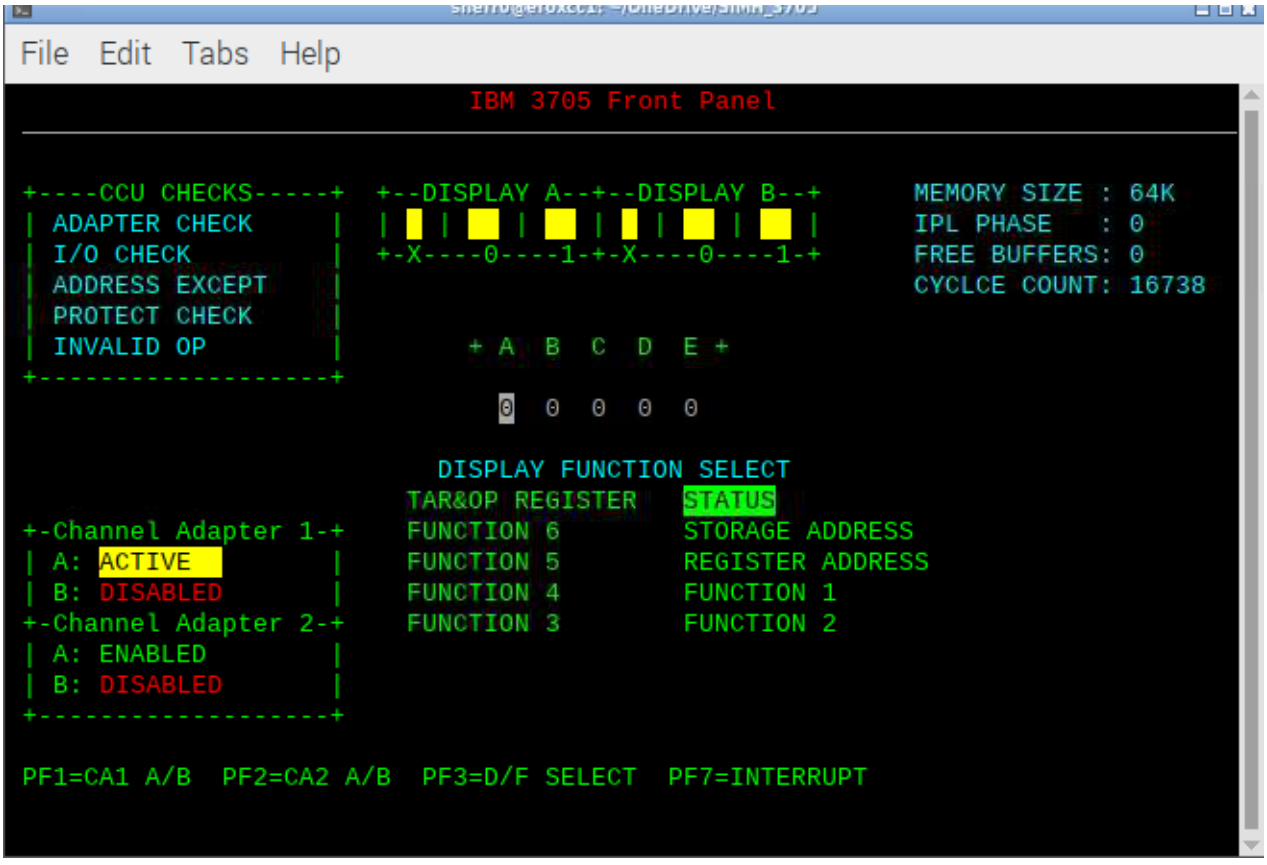
Press Ctrl-E. The SIM prompt "sim>" should appear. Now enter:

```
sim> d shwpanel 1
```

The sim prompt reappears. Now enter:

```
sim> c
```

The 3705 front-panel should now appear:



The panel shows at the top right hand:

- MEMORY SIZE : 64K
  This is the 3705 memory size, taken from the cnf file.
- IPL PHASE : 0
  This is the current IPL phase. Will range from 0 (not IPLéd) to 3 (NCP loaded).

- FREE BUFFERS: 208
  The available buffers for the NCP. Before NCP is loaded this will show 0. During NCP operation the value will fluctuate.
- CYCLE COUNT : nnnn
  Shows the content of the cycle utilization count register. Every 8 instructions this counter is incremented. It is a 15 bit register, which will wrap around after the max value is reached.

The top center shows the DISPLAY A and DISPLAY B registers. On a real 3705 panel these are shown as individual bits. As this would clutter the emulator panel, it is shown as five hexadecimal characters: x xx xx.
The error indicators are listed separately at the top left (box CCU CHECKS). If an error occurs, a red "light" will flash after the relevant check.

In the center of the panel the HEX switches are show. They are labeled A – E. The actual switches are depicted as single digits. A switch can be selected by the left or right cursor keys. The select switch will be highlighted. The value can be changed with the up and down cursor keys.

Below the HEX switches, the DISPLAY FUNCYION SELECT switch is shown, with 10 possible settings. The default is STATUS. The switch can be "turned" by pressing PF 3 key. The switch turns clockwise. The DISPLAY FUNCTION switch is described in more detail below.

At the bottom left corner, the Channel Adapter switches are shown. This allows to switch a channel adapter from position A to B. Each channel adapter can be connected to two hosts. A to one host, B to another. In case of a failure of the active host, the 3705 can be enable for the backup-host by switching the relevant channel adapter to "B". In case the failing host is recovered, the channel adapter can be switched back to "A".
Switching channel adapter 1 from A to B or vice versa is done via PF 1 key, for channel adapter 2, use PF 2.
An active channel Adapter is shown as "ACTIVE", a connected, but not active adapter is shown as "ENABLED", a not connected adapter is show as "DISABLED". In the context of the 3705 emulator, a connected adaptor is one with a TCP/IP connection to Hercules. If that connection is actually online, it is shown as "ACTIVE", else it is "ENABLED"

Warning: Switching a channel adapter is **immediate**. If the (3705) unit is still online while switching, various I/O related errors will occur. An IPL might be needed to recover from this situation. So before switching, make sure the unit is **offline**.

The DISPLAY FUNCTION SELECT:
switch PF 3 changes the switch. The current selection is highlighted. The selections are:

- STATUS: This shows the current 3705 status in the A and B DISPLAY. If there is a CCU check, a red light will appear in the CCU CHECKS box. During normal operation the display will be empty.
- STORAGE ADDRESS: This can be used to display the contents of a 3705-storage location. Enter the address using the HEX switches A-F. If a valid address is entered, the address will be shown in DISPLAY A, the contents in DISPLAY B. If an invalid address is set, the ADDRESS EXCEPT "light" will go on.
- REGISTER ADDRESS: This can be used to show the contents of one of the 3705 (input) registers. When this function is selected, HEX switch B and D will be highlighted. These can be used to enter the register

address; the other switches cannot be used. The switch settings are shown in DISPLAY A, the high-order bits of byte 0 and 1. The content of the register is show in DISPLAY B, bytes 0 and 1.

- FUNCTION 1: Not yet implemented
- FUNCTION 2: Not yet implemented
- FUNCTION 3: Not yet implemented
- FUNCTION 4: Not yet implemented
- FUNCTION 5: Not yet implemented
- FUNCTION 6: Not yet implemented
- TAR&OP REGISTER: Not yet implemented.

The front-panel is updated after pressing any key, except the Home key.

Exiting the Front-panel: Press the Home key.

h) Loading the NCP

Now we can load the generated NCP.

Restart Hercules and...

```
  CCTAG002D 1:0660: Preparing connection with remote channel adapter
  CCBUS019I 1:0660: Waiting for bus(49) connection to be established
  CCBUS019I 1:0660: Waiting for tag(50) connection to be established
  CCTAG003I 1:0660: tag connection established on socket 50
  CCBUS003I 1:0660: bus connection established on socket 49
  CCTAG019I 1:0660: connections on port 37051; Bus socket: 49, Tag socket: 50
```

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

```
   ==> ipl 148
```

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

Adding tracesna=yes in de Hercules 'conf/tk4-default' file will display the translated SNA command's that are sent/received.

Check that the 3705 device address is online in MVS:

```
  -           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
```

```
  -           v net,act,id=sdlcpa01,logon=tso,logmode=mhp3278e
     (this will activates the LU with the proper logmode and
      starts the TSO session).
```

Connect your TN3270 client to the EMU3705 IP address 192.168.1.5 port 32001.

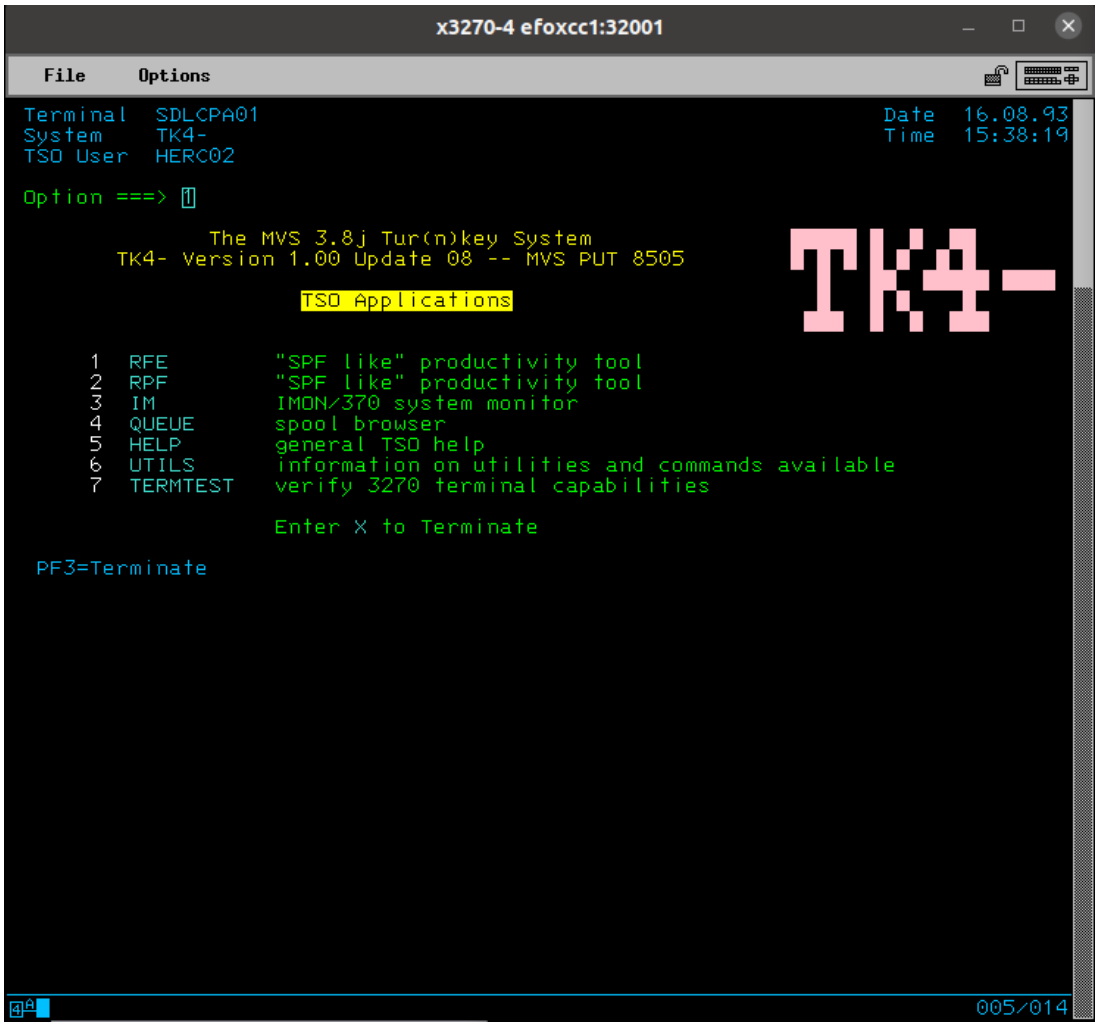
Note: during testing we discovered that quick3270 does not work with the tn3270 server in the 3271/3274. X3270 works perfect.

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

Press
[RESET]
[CLEAR]
[RESET]

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

Wait for the TSO login prompt and login:



i) LIB panel

The Line Interface Base (LIB) is the one place where all lines connect to. Each stand-alone emulator (3271,3274, DLSw, NModem) has the -line switch as a mandatory start parameter to identify the line to which the connection should be made. Node that this line number must correspond to the line number in the NCP definition for the device being connected.

A successful connection is identified by the message "LIB: 327x connected to line-xx", whew xx is the line number.

The LIB and Scanner will now manage the RS232 signals. The LIB comes with a panel that shows the RS232 signals in real time.

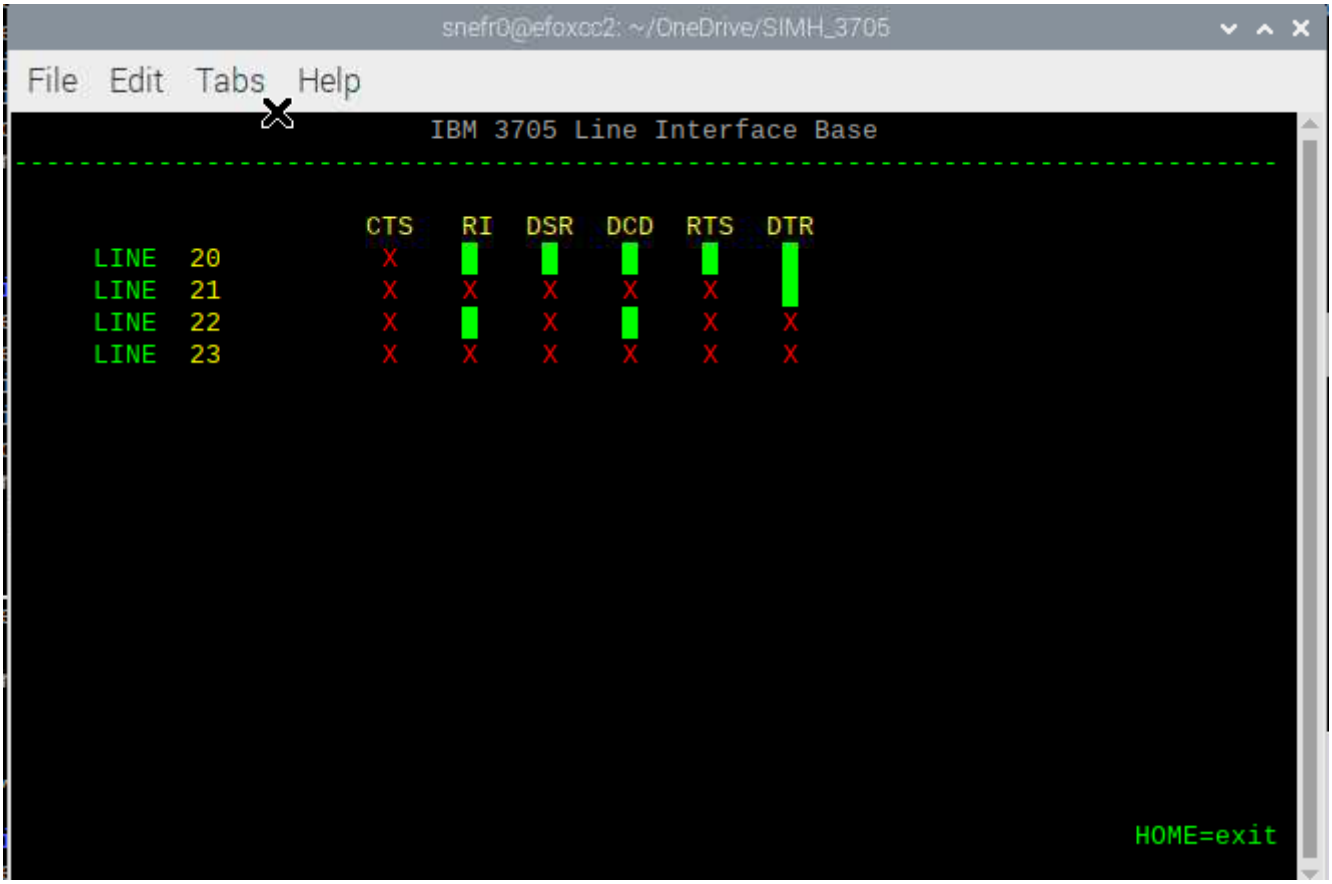
The panel can be activated by press "Ctrl-E" at the SIMH 3705 terminal.
The SIM prompt "sim>" should appear. Now enter:

```
sim> d shwlib 1
```

The sim prompt reappears. Now enter:

```
sim> c
```

The LIB panel should now appear:



The LIB panel is dynamically build based on the number of lines defined in the 3705 (Default is 4).
The above display shows Line 20, connected, active to VTAM and in session (RTS is high).
Line 21 is active for VTAM (DTR high), but not connected. Therefore, this must be a switched line.

Line 22 shows connected (DSR and RI), but not active for VTAM.
Line 23 is not connected and not active for VTAM.

j) DLSw

With DLSw you can connect a real SDLC device to i3705. You will need a real DLSw router to which the SDLC device is connected.

The Data Link Switch (DLSw) emulator connects to the real DLSw router and to a line of the 3705 emulator.
The real DLSw route needs to be configured properly. The config parameters relevant to the DLSw connection are (for a Cisco 2800 router):

dlsw local-peer peer-id 192.168.2.91	**This is the IP address of the DLSw router**
dlsw remote-peer 0 tcp 192.168.2.72	This is the ip address of the host running the DLSw emulator
interface FastEthernet0/0	Ethernet interface to be used
ip address 192.168.2.91 255.255.255.0	IP address and netmask of the ethernet interface
interface Serial0/0/0	Serial interface to which the SDLC device is attached
encapsulation sdlc	SDLC frame encapsulation
clock rate 9600	Baud rate between the DSLw router
sdlc role primary	DLSw router plays role of primary SDLC device
sdlc vmac 4000.0999.0100	Arbitrary (virtual) MAC address associated with the SDLC device. It is not used.
sdlc address C1	Address of SDLC PU connected to the DLSw router
sdlc xid C1 01700018	XID of the SDLC PU. Must match VTAM switched node definition.
sdlc partner 4000.1020.1000	The MAC address of the 3705. Not used.
sdlc dlsw C1	Enable DLSw for this SDLC address .

Building the DLSw:

```
# make DLSw

lib paths are: /lib/ /lib/arm-linux-gnueabihf/ /lib/arm-linux-
gnueabihf/neon/vfp/ /lib/arm-linux-gnueabihf/vfp/neon/ /opt/vc/lib/
/usr/lib/arm-linux-gnueabihf/libfakeroot/
include paths are:  /usr/lib/gcc/arm-linux-gnueabihf/10/include
/usr/local/include /usr/include/arm-linux-gnueabihf /usr/include
using libm: /lib/arm-linux-gnueabihf//libm.so
using librt: /lib/arm-linux-gnueabihf//librt.so
using libpthread: /lib/arm-linux-gnueabihf//libpthread.so
/usr/include/pthread.h
using semaphore: /usr/include/semaphore.h
using mman: /usr/include/arm-linux-gnueabihf/sys/mman.h
using libdl: /lib/arm-linux-gnueabihf//libdl.so /usr/include/dlfcn.h
***
*** DLSw Simulator being built with:
*** - compiler optimizations and no debugging support. GCC Version: 10.2.1.
***
```

```
gcc -std=c99 -U__STRICT_ANSI__  -O2 -finline-functions -fgcse-after-reload -
fpredictive-commoning -fipa-cp-clone -fno-unsafe-loop-optimizations -fno-
strict-overflow -Wno-unused-result -I . -D_GNU_SOURCE -DUSE_READER_THREAD -
DHAVE_SEMAPHORE -DHAVE_SHM_OPEN -DHAVE_DLOPEN=so  DLSw/DLSw_rt.c  -I DLSw -o
BIN/DLSw -lm -lrt -lpthread -ldl
```

Starting DLSw:

```
BIN/DLSw -peerip 192.168.2.91 -cchn efoxcc2 -line 20
```

This connects DLSw to line 20 of the i3705 on host efoxcc2 and it connects to a real DLSw route which has ip address 192.168.2.91

Instead of a hostname, an IP address can be specified with switch -cchip.

When all goes well the following messages appear:

```
DLSw: Connection to be established with peer DLSw at ip address 192.168.2.91
DLSw: Connection to be established with SLDC line at 3705 on host efoxcc2
DLSw: Connection to be established with SDLC line 20
DLSw: state DISCONNECTED
DLSw: Waiting for SDLC line connection to be established
DLSw: DLSw ready, waiting for connection on TCP port 2065
DLSw: Waiting for DLSw peer outbound connection to be established
DLSw: Outbound connection to peer has been established
DLSw: SDLC line connection has been established
DLSw: Inbound connection from peer DLSw at 192.168.2.91
DLSw: state CIRCUIT_START
DLSw: state CIRCUIT_START
DLSw: state CIRCUIT_ESTABISHED
DLSw: state CONNECT_PENDING
DLSw: state CONNECTED
```

The key message is the last one: **"state CONNECTED"** this means the end-to-end connectivity is established and the DLSw's and the SDLC device are ready. Once in the "Connected" state, the DLSw emulator will respond to a Request to Send (RTS) from the 3705 scanner with a "Clear To Send" (CTS). In effect, the connected state will allow the 3705 to send data across the line and DLSw's to the SDLC device.

DLSw can be terminated with "Ctrl C".

k) NModem

NModem (null modem) can be used to connect two i3705's together. It acts as a null modem, by forwarding data from one i3705 to another and vice versa.
NB: At this point in time this has no use on a MVS3.8 system. Once we can developed a remote i3705 system, NModem can be used to connect a channel attached 3705 to a remote 3705.
In case of systems with a higher release of VTAM and NCP, this can be used to create cross-domain links between multiple hosts.

Building the NModem:

```
# make NModem
```

```
lib paths are: /lib/ /lib/arm-linux-gnueabihf/ /lib/arm-linux-
gnueabihf/neon/vfp/ /opt/vc/lib/ /usr/lib/arm-linux-gnueabihf/libfakeroot/
include paths are:  /usr/lib/gcc/arm-linux-gnueabihf/8/include
/usr/local/include /usr/lib/gcc/arm-linux-gnueabihf/8/include-fixed
/usr/include/arm-linux-gnueabihf /usr/include
using libm: /lib/arm-linux-gnueabihf//libm.so
using librt: /lib/arm-linux-gnueabihf//librt.so
using libpthread: /lib/arm-linux-gnueabihf//libpthread.so
/usr/include/pthread.h
using semaphore: /usr/include/semaphore.h
using mman: /usr/include/arm-linux-gnueabihf/sys/mman.h
using libdl: /lib/arm-linux-gnueabihf//libdl.so /usr/include/dlfcn.h
***
*** NModem Simulator being built with:
*** - compiler optimizations and no debugging support. GCC Version: 8.3.0.
***
gcc -std=c99 -U__STRICT_ANSI__  -O2 -finline-functions -fgcse-after-reload -
fpredictive-commoning -fipa-cp-clone -fno-unsafe-loop-optimizations -fno-
strict-overflow -Wno-unused-result -I . -D_GNU_SOURCE -DUSE_READER_THREAD -
DHAVE_SEMAPHORE -DHAVE_SHM_OPEN -DHAVE_DLOPEN=so  NModem/NModem_mm.c  -I
NModem -o BIN/NModem -lm -lrt -lpthread -ldl
```

Starting NModem:

```
BIN/NModem -cchn1 efoxcc1 -cchn2 efoxcc3 -line1 21 -line2 21
```

This connects one end of NModem to line 21 of i3705 on host efoxcc1, the other line is connected to line 21 of i3705 on host efoxcc3.

Switches -cchn1 and -cchn2 specify the hostnames of where i3705 are running. Instead of a hostname, an IP address can be specified with switch -cchip1 or -cchip2.
Switch -line1 specifies the line number on the first 3705, switch -line2 is for the line number on the second 3705.

When all goes well the following messages appear:

```
NModem: Connection to be established with line-1 at 3705 on host efoxcc1
NModem: Connection to be established with line-2 at 3705 on host efoxcc3
NModem: Connection to be established with line-1 21
NModem: Connection to be established with line-2 21
NModem: Line 1 connection has been established
NModem: Line 2 connection has been established
```

NModem can be terminated with “Ctrl C”.

I) Issues and remarks

a) IBM 3704 / IBM 3705-I emulation
   The 3705 emulator, by default, emulates a 3705-II models A-H. The 3704 or 3705-I only differ in memory size configuration. There is little point in catering for these memory configurations, since the 3705-II can be configured to run with a storage amount suitable for an IBM 3704 or 3705-I.

b) SDLC with VTAM L2
Very annoying is that after a logoff, logon is no longer possible. First the LU has to be inactivated/activated for VTAM. Thereafter logon is possible again. The issue is still under investigation, but very likely related to the fact that SDLC was still at an infancy state on VTAM L2. The issue could possibly be circumvented with a proper SNA network solicitor. TK4's SNASOL could do the trick, but see SNASOL below. This issue does not exist on BSC.

c) BSC
Possibly VTAM may produce message IST201 CATASTROPHIC I/O ERROR 0506. However, this is not that catastrophic, since it only appears to produce a hick-up in response. Mostly seen around midnight, when nothing happens on the 3271. Could be related to background activities on the host running the 3271. A possible fix could be to adjust the poll frequency, which is under investigation.

d) ZD60009 (this includes TK4)
Prycroft six usermod ZD6009 (default of TK4) enhances the MVS38 with some TSO/E capabilities. However, does not entirely fit with a "real" 3705. For TSO logon via SDLC the following message appears:

```
 IKTXLOG TGET RC=X'18',LEN=X'0004',DATA=X'016C6102'
     IF LOOPING USE PF3/PF15 TO END
```

Pressing PF/3 resolves this (until next logon). In some cases, the screen remains blank. Pressing Enter results in the above massage to appear.

TSO logon via 3271 (BSC) the message "IKT00405I SCREEN EARASURE DUE TO ERROR RECOVERY PROCEDURE" appears. Pressing PA1 resolves this.

e) SNASOL
When the TK4 version of SNASOL is used as the LOGAPPL in the LU VTAM definition, it will not pick up the default logmode from the LU. Specifically, the presentation service parameters, which includes the screen size. This results in the 3274 to reject the BIND from SNASOL, resulting in SNASOL abend. To overcome this, a reworked SNASOL is included on the 3705 GitHub site. This modified SNASOL application will set the logmode to MHP3278E. The BIND will now succeed and the SNASOL screen is displayed. From SNASOL you can now logon to TSO (the only defined application). After logging off, you will go back to the SNASOL screen, allowing another logon. This also resolves issue 2 from this list. The JCL required to assemble & link edit SNASOL is included on the GitHub site and includes the instructions required to get SNASOL running.

f) 3705 Front Panel: IPL PHASE stays at zero.
This is under investigation.

g) NCP: Switched network definition (SWNET): LU activations fails because the NCP does not route the ACTLU positive response back to VTAM. This appears to be a bug in NCP.

h) UNSUPPORTED FUNCTION: When a LU (i.e. TN3270) is connected to the 3274 **after** the LU has been activated by VTAM, you will receive "UNSUPPORTED FUCNTION". This is due to the LU sending a NOTIFY command to VTAM to inform VTAM that the LU is now "powered on". The NOTIFY command is not supported by VTAM L2, hence this message. This can be ignored.

i) LIB Panel: RTS is almost constantly high for an active line. This might not be an issue, but it is not as expected. Under investigation.

m) Appendix A

Below are some sample NCP configurations.

a) SDLC NCP with multiple PU's and LU's

```
*********************************************************************
*                                                                   *
*      NCP 5 ONLY, NOT SUPPORTED BY ACF/NCP/VS                      *
*      SOURCE FOR NCP GENERATION (ALL VTAM LEVELS AND TCAM 10)      *
*      SUPPORTS BATCH AND INQUIRY FOR SDLC PHYSICAL UNITS           *
*      THIS GENERATION IS FOR AN IBM 3705                           *
*                                                                   *
*********************************************************************
         SPACE 2
*********************************************************************
*      PCCU SPECIFICATIONS - OS/VS (VTAM ONLY)                      *
*********************************************************************
NCPSTART PCCU  CUADDR=410,         3704 CONTROL UNIT ADDRESS          X
               MAXDATA=530,                                          X
               AUTODMP=NO,         PROMPT BEFORE DUMPING NCP         X
               AUTOIPL=YES,        AUTOIPL AND RESTART               X
               DUMPDS=NCPDUMP,     AUTODUMP REQUESTED                X
               INITEST=YES         NCP INITIALIZATION TEST
         EJECT
*********************************************************************
*      BUILD MACRO SPECIFICATIONS FOR OS                            *
*********************************************************************
NCPBUILD BUILD MAXSUBA=31,          MUST BE SAME AS IN VTAM STR DEF   X
               LOADLIB=VTAMLIB,     LIBRARY FOR NCP LOAD MODULE       X
               OBJLIB=NCPOBJ1,      LIBRARY FOR ASSEMBLER OUTPUTS     X
               LESIZE=320,          REGION SIZE FOR LINK-EDIT         X
               QUALIFY=SYS1,        1ST LEVEL QUALIFIER               X
               UNIT=SYSDA,          DATA SET FOR ASSEMBLY             X
               MEMSIZE=64,          3705 STORAGE SIZE IS 64K BYTES    X
               TYPGEN=NCP,          NCP ONLY                          X
               ABEND=YES,           ABEND FACILITY INCLUDED           X
               ANS=YES,             AUTOMATIC NETWORK SHUTDOWN        X
               ASMXREF=NO,          NO ASSEMBLER CROSS-REFERENCE      X
               BFRS=64,             NCP BUFFER SIZE                   X
               CHANTYP=TYPE2,                                         X
               ERASE=NO,            DO NOT ERASE BUFFERS (DEFAULT)    X
               ENABLTO=2.2,         LEASED LINE ONLY (DEFAULT)        X
               JOBCARD=MULTI,       JOBCARDS PROVIDED BY NCR GEN      X
               MODEL=3705-2,        .                                 X
               NEWNAME=EFXNCP1,     NAME OF THIS LOAD MODULE          X
               OLT=YES,             ONLINE TEST AVAILABLE(DEFAULT)    X
               SLODOWN=12,          SLOWDOWN WHEN 12% OF BUFFERS AVAIL X
               SUBAREA=3,           SUBAREA ADDRESS = 3               X
               TRACE=(YES,10)       10 ADDRESS-TRACE ENTRIES
         EJECT
*********************************************************************
*      SYSCNTRL OPTIONS FOR VTAM OR TCAM                            *
*      NOTE THAT OPERATOR CONTROLS ARE NOT INCLUDED.                *
*********************************************************************
NCPSYSC  SYSCNTRL OPTIONS=(MODE,                                      X
               RCNTRL,RCOND,RECMD,RIMM,ENDCALL,                       X
```

```
              BHSASSC)
         EJECT
*********************************************************************
*      HOST MACRO SPECIFICATIONS OS VTAM                            *
*      UNITSZ TIMES MAXBFRU MINUS BFRPAD EQUALS MAX MESSAGE SIZE    *
*      FOR INBOUND MESSAGES                                         *
*********************************************************************
NCPHOST  HOST  INBFRS=5,           INITIAL 3705 ALLOCATION            X
               MAXBFRU=2,          VTAM BUFFER UNIT ALLOCATION        X
               UNITSZ=256,         *                                  X
               BFRPAD=28,          VTAM(OS=28, DOS=15, ACF=0), EXTM=2 X
               SUBAREA=1,           SUBAREA ADDRESS = 1               X
               DELAY=.2,           .2 SECOND ATTENTION DELAY          X
               STATMOD=YES,        YES VTAM, NO FOR EXTM              X
               TIMEOUT=(120.0)     AUTO SHUT DOMN IF NO RESP IN 120SEC
         SPACE 2
*********************************************************************
*      CSB MACRO SPECIFICATIONS                                     *
*********************************************************************
NCPCSB   CSB   SPEED=(2400),       BUS MACH CLOCK                     X
               MOD=0,              SCANNER ADDRESS 000 TO 01F         X
               TYPE=TYPE2          TYPE 1 COMM SCANNER
         EJECT
*********************************************************************
*      SPECIFICATIONS FOR SDLC LEASED LINES                         *
*      GROUP MACRO SPECIFICATIONS                                   *
*********************************************************************
SDLCGPL GROUP LNCTL=SDLC,          SYNCHRONOUS DATA LINK              X
               DIAL=NO,            REQUIRED FOR LEASED LINE           X
               REPLYTO=1.0,        USE DEFAULT                        X
               TYPE=NCP            NCP ONLY
        SPACE  2
*********************************************************************
*      LINE MACRO SPECIFICATION - FULL-DUPLEX, LEASED               *
*      MAY BE USED FOR 3790, 3600, OR 3650                          *
*                                                                   *
*      NOTE: LINE SPEED MAY BE RAISED TO 2400 FOR                   *
*      ALL PHYSICAL UNITS AND TO 4800 FOR 3600 AND 3650             *
*      WITHOUT DOING A NEW GEN OF NCP.                              *
*      RETRIES VALUE FOR LINE SHOULD BE GREATER THAN 30             *
*      SECONDS AND LESS THAN ONE MINUTE FOR 3650.                   *
*                                                                   *
*********************************************************************
SDLC01   LINE  ADDRESS=020,        TRANSMIT AND RECEIVE ADDRESSES     X
               DUPLEX=HALF,        MODEM IS STRAPPED FOR FULL DUPLEX  X
               SPEED=56000,        SPEED MAY BE HIGHERCSEE NOTES)     X
               NRZI=NO,            SPECIFY YES ONLY IF REQUIRED       X
               NEWSYNC=NO,         CHECK MODEM REQUIREMENTS           X
               CLOCKNG=EXT,        MODEM PROVIDES CLOCKING            X
               POLLED=YES,                                            X
               RETRIES=(5,10,4)    5 RETRIES PER RECOVERY SEQUENCE
         SPACE 2
*********************************************************************
*      SERVICE ORDER FOR SDLC LINK                                  *
*********************************************************************
         SERVICE ORDER=(SDLCPU01,SDLCPU02)
         EJECT
*********************************************************************
```

```
*      PHYSICAL UNIT SPECIFICATIONS                                  *
*********************************************************************
SDLCPU01 PU    ADDR=C1,           POLL ADDRESS                       X
               PUTYPE=2,                                             X
               ISTATUS=ACTIVE,                                       X
               MODETAB=BSPLMT02,                                     X
               SSCPFM=USS3270,                                       X
               USSTAB=BSPUDT01,                                      X
               MAXOUT=7,          MAX PATH INFO UNITS BEFORE RESPONSE  X
               MAXDATA=4096,      MAXIMUM AMOUNT OF DATA               X
               PASSLIM=7,         .                                    X
               PACING=0,          FOR DISPLAYS AND DSC PRINTERS        X
               VPACING=0,         FOR DISPLAYS AND DSC PRINTERS        X
               DISCNT=(NO),       .                                    X
               RETRIES=(,1,4)     4 RETRIES, 1 SECOND BETWEEN
         SPACE 2
*********************************************************************
*      LOGICAL UNIT SPECIFICATIONS                                   *
*********************************************************************
SDLCLU01 LU LOCADDR=2,                                               X
               LUTYPE=2,                                             X
               BATCH=NO,                                             X
               BUFLIM=2,                                             X
               VPACING=0,                                            X
               LOGAPPL=SNASOL,                                       X
               ISTATUS=INACTIVE
SDLCLU02 LU LOCADDR=3,                                               X
               LUTYPE=2,                                             X
               ISTATUS=INACTIVE,                                     X
               SSCPFM=USS3270,                                       X
               LOGAPPL=NETSOL
SDLCLU03 LU LOCADDR=4,                                               X
               LUTYPE=2,                                             X
               ISTATUS=INACTIVE,                                     X
               SSCPFM=USS3270,                                       X
               LOGAPPL=NETSOL
SDLCLU04 LU LOCADDR=5,                                               X
               LUTYPE=2,                                             X
               ISTATUS=INACTIVE,                                     X
               SSCPFM=USS3270,                                       X
               LOGAPPL=NETSOL
         EJECT
*********************************************************************
*      PHYSICAL UNIT SPECIFICATIONS                                  *
*********************************************************************
SDLCPU02 PU    ADDR=C2,           POLL ADDRESS                       X
               PUTYPE=2,                                             X
               ISTATUS=ACTIVE,                                       X
               MODETAB=BSPLMT02,                                     X
               SSCPFM=USS3270,                                       X
               USSTAB=BSPUDT01,                                      X
               MAXOUT=7,          MAX PATH INFO UNITS BEFORE RESPONSE  X
               MAXDATA=4096,      MAXIMUM AMOUNT OF DATA               X
               PASSLIM=7,         .                                    X
               PACING=0,          FOR DISPLAYS AND DSC PRINTERS        X
               VPACING=0,         FOR DISPLAYS AND DSC PRINTERS        X
               DISCNT=(NO),       .                                    X
               RETRIES=(,1,4)     4 RETRIES, 1 SECOND BETWEEN
```

```
         SPACE 2
*************************************************************************
*      LOGICAL UNIT SPECIFICATIONS                                      *
*************************************************************************
SDLCLU11 LU LOCADDR=2,                                                  X
               LUTYPE=2,                                                X
               BATCH=NO,                                                X
               BUFLIM=2,                                                X
               VPACING=0,                                               X
               LOGAPPL=TSO,                                             X
               ISTATUS=ACTIVE
SDLCLU12 LU LOCADDR=3,                                                  X
               LUTYPE=2,                                                X
               ISTATUS=INACTIVE,                                        X
               SSCPFM=USS3270,                                          X
               LOGAPPL=NETSOL
SDLCLU13 LU LOCADDR=4,                                                  X
               LUTYPE=2,                                                X
               ISTATUS=INACTIVE,                                        X
               SSCPFM=USS3270,                                          X
               LOGAPPL=NETSOL
SDLCLU14 LU LOCADDR=5,                                                  X
               LUTYPE=2,                                                X
               ISTATUS=INACTIVE,                                        X
               SSCPFM=USS3270,                                          X
               LOGAPPL=NETSOL
         EJECT
*************************************************************************
*      GENEND DELIMITER                                                 *
*************************************************************************
         GENEND
         END
```

b) BSC NCP

```
*********************************************************************
*                                                                   *
*      NCP 5 (?) ONLY, NOT SUPPORTED BY ACF/NCP/VS                  *
*      SOURCE FOR NCP GENERATION (ALL VTAM LEVELS AND TCAM 10)      *
*      SUPPORTS BATCH AND INQUIRY FOR SDLC PHYSICAL UNITS           *
*      THIS GENERATION IS FOR AN IBM 3705                           *
*                                                                   *
*********************************************************************
         SPACE 2
*********************************************************************
*      PCCU SPECIFICATIONS - OS/VS (VTAM ONLY)                      *
*********************************************************************
NCPSTART PCCU  CUADDR=410,          3704 CONTROL UNIT ADDRESS          X
               AUTODMP=NO,          PROMPT BEFORE DUMPING NCP          X
               AUTOIPL=YES,         AUTOIPL AND RESTART                X
               DUMPDS=NCPDUMP,      AUTODUMP REQUESTED                 X
               INITEST=YES          NCP INITIALIZATION TEST
         EJECT
*********************************************************************
*      BUILD MACRO SPECIFICATIONS FOR OS                            *
*********************************************************************
NCPBUILD BUILD MAXSUBA=31,           MUST BE SAME AS IN VTAM STR DEF   X
               LOADLIB=VTAMLIB,      LIBRARY FOR NCP LOAD MODULE       X
               OBJLIB=NCPOBJ1,       LIBRARY FOR ASSEMBLER OUTPUTS     X
               LESIZE=320,           REGION SIZE FOR LINK-EDIT         X
               QUALIFY=SYS1,         1ST LEVEL QUALIFIER               X
               UNIT=SYSDA,           DATA SET FOR ASSEMBLY             X
               MEMSIZE=64,           3705 STORAGE SIZE IS 64K BYTES    X
               TYPGEN=NCP,           NCP ONLY                          X
               ABEND=YES,            ABEND FACILITY INCLUDED           X
               ANS=YES,              AUTOMATIC NETWORK SHUTDOWN        X
               ASMXREF=NO,           NO ASSEMBLER CROSS-REFERENCE      X
               BFRS=88,              NCP BUFFER SIZE                   X
               CHANTYP=TYPE2,                                          X
               ERASE=NO,             DO NOT ERASE BUFFERS (DEFAULT)    X
               ENABLTO=2.2,          LEASED LINE ONLY (DEFAULT)        X
               JOBCARD=MULTI,        JOBCARDS PROVIDED BY NCR GEN      X
               MODEL=3705-2,         .                                 X
               NEWNAME=EFXNCP5,      NAME OF THIS LOAD MODULE          X
               OLT=NO,               ONLINE TEST AVAILABLE(DEFAULT)    X
               SLODOWN=12,           SLOWDOWN WHEN 12% OF BUFFERS AVAIL X
               SUBAREA=3,            SUBAREA ADDRESS = 3               X
               TRACE=(YES,10)        10 ADDRESS-TRACE ENTRIES
         EJECT
*********************************************************************
*      SYSCNTRL OPTIONS FOR VTAM OR TCAM                            *
*      NOTE THAT OPERATOR CONTROLS ARE NOT INCLUDED.                *
*********************************************************************
NCPSYSC  SYSCNTRL OPTIONS=(MODE,                                      X
               RCNTRL,RCOND,RECMD,RIMM,ENDCALL,                       X
               BHSASSC)
         EJECT
*********************************************************************
*      HOST MACRO SPECIFICATIONS OS VTAM                            *
*      UNITSZ TIMES MAXBFRU MINUS BFRPAD EQUALS MAX MESSAGE SIZE    *
*      FOR INBOUND MESSAGES                                         *
```

```
*********************************************************************
NCPHOST  HOST  INBFRS=10,          INITIAL 3705 ALLOCATION             X
               MAXBFRU=4,          VTAM BUFFER UNIT ALLOCATION         X
               UNITSZ=256,         *                                   X
               BFRPAD=28,          VTAM(OS=28, DOS=15, ACF=0), EXTM=2  X
               SUBAREA=1,           SUBAREA ADDRESS = 1                X
               DELAY=.2,           .2 SECOND ATTENTION DELAY           X
               STATMOD=YES,        YES VTAM, NO FOR EXTM               X
               TIMEOUT=(120.0)     AUTO SHUT DOMN IF NO RESP IN 120SEC
         EJECT
*********************************************************************
*      CSB MACRO SPECIFICATIONS                                     *
*********************************************************************
NCPCSB   CSB   SPEED=(1200),       BUS MACH CLOCK                      X
               MOD=0,              SCANNER ADDRESS 000 TO 01F          X
               TYPE=TYPE2          TYPE 1 COMM SCANNER
         EJECT
*********************************************************************
*      SPECIFICATIONS FOR BSC  LEASED LINES                         *
*      GROUP MACRO SPECIFICATIONS                                   *
*********************************************************************
BSC3270 GROUP LNCTL=BSC,                                             X
               DIAL=NO,            REQUIRED FOR LEASED LINE            X
               TRANSFR=8,                                              X
               CUTOFF=10,                                              X
               CRETRY=7,                                               X
               XMITLIM=1,                                              X
               REPLYTO=1,                                              X
               TYPE=NCP            NCP ONLY
         EJECT
*********************************************************************
*      LINE MACRO SPECIFICATION - FULL-DUPLEX, LEASED               *
*      MAY BE USED FOR 3790, 3600, OR 3650                          *
*                                                                   *
*      NOTE: LINE SPEED MAY BE RAISED TO 2400 FOR                   *
*      ALL PHYSICAL UNITS AND TO 4800 FOR 3600 AND 3650             *
*      WITHOUT DOING A NEW GEN OF NCP.                              *
*      RETRIES VALUE FOR LINE SHOULD BE GREATER THAN 30             *
*      SECONDS AND LESS THAN ONE MINUTE FOR 3650.                   *
*                                                                   *
*********************************************************************
BSCL01   LINE  ADDRESS=020,        TRANSMIT AND RECEIVE ADDRESSES      X
               DUPLEX=HALF,        MODEM IS STRAPPED FOR FULL DUPLEX   X
               SPEED=9600,         SPEED MAY BE HIGHERCSEE NOTES)      X
               NEWSYNC=NO,         CHECK MODEM REQUIREMENTS            X
               CLOCKNG=EXT,        MODEM PROVIDES CLOCKING             X
               NEGPOLP=.1,                                             X
               POLLED=YES,                                             X
               RETRIES=(5,10,4),   5 RETRIES PER RECOVERY SEQUENCE     X
               ISTATUS=ACTIVE,                                         X
               CODE=EBCDIC,                                            X
               INTPRI=1,                                               X
               POLIMIT=(1,QUEUE),                                      X
               PAUSE=1,                                                X
               SERVPRI=OLD,                                            X
               SESSION=1,                                              X
               LOGAPPL=NETSOL,                                         X
               SSCPFM=USS3270,                                         X
```

```
               USSTAB=BSPUDT01
         EJECT
*********************************************************************
*      SERVICE ORDER FOR BSC  LINK                                  *
*********************************************************************
         SERVICE ORDER=(BSC3274,BSCTERM1)
         SPACE 2
*********************************************************************
*      CLUSTER SPECIFICATIONS                                       *
*********************************************************************
BSC3274  CLUSTER CUTYPE=3271,                                        X
               INHIBIT=SUBBLOCK,                                     X
               GPOLL=40407F7F,                                       X
               MODETAB=BSPLMT02
         SPACE 2
*********************************************************************
*      TERMINAL SPECIFICATIONS                                      *
*********************************************************************
BSCTERM1 TERMINAL TERM=3277,                                         X
               ISTATUS=ACTIVE,                                       X
               LOGAPPL=NETSOL,                                       X
               LOGTAB=BSPLIN01,                                      X
               FEATUR2=(PFK,MODEL2),                                 X
               ADDR=60604040,                                        X
               POLL=40404040
         SPACE 2
*********************************************************************
*      GENEND DELIMITER                                             *
*********************************************************************
         GENEND
         END
```

c) **NCP for last version of NCP that supports 3705.**

```
*********************************************************************
*                                                                   *
*      ACF/NCP V3                                                   *
*      THIS GENERATION IS FOR AN IBM 3705-II                        *
*                                                                   *
*********************************************************************
         SPACE 2
*********************************************************************
*      PCCU SPECIFICATIONS - OS/VS (VTAM ONLY)                      *
*********************************************************************
NCPSTART PCCU  CUADDR=5A0,          3705 CONTROL UNIT ADDRESS          X
               AUTODMP=NO,          PROMPT BEFORE DUMPING NCP          X
               AUTOIPL=NO,          NO AUTOIPL AND RESTART             X
               LOADSTA=5A0-S,                                          X
               DUMPSTA=5A0-S,                                          X
               DUMPDS=NCPDUMP,      AUTODUMP REQUESTED                 X
               SUBAREA=1,                                              X
               CHANCON=COND,                                           X
               OWNER=NCPHOST,                                          X
               VFYLM=YES,                                              X
               MAXDATA=4096,                                           X
               INITEST=NO           NCP INITIALIZATION TEST
         EJECT
*********************************************************************
*      BUILD MACRO SPECIFICATIONS FOR OS                            *
*********************************************************************
NCPBUILD BUILD MAXSUBA=31,           MUST BE SAME AS IN VTAM STR DEF   X
               LOADLIB=NCPLIB,       LIBRARY FOR NCP LOAD MODULE       X
               QUALIFY=SYS1,         1ST LEVEL QUALIFIER               X
               VERSION=V3,                                             X
               TYPSYS=OS,                                              X
               MEMSIZE=256,          3705 STORAGE SIZE IS 256K         X
               TYPGEN=NCP,           NCP ONLY                          X
               MAXSSCP=2,                                              X
               NUMHSAS=2,                                              X
               BFRS=88,              NCP BUFFER SIZE                   X
               CA=(TYPE2),           CA 1 IS TYPE 2                    X
               NCPCA=(ACTIVE),       CA 1 ACTIVE                       X
               ERASE=NO,             DO NOT ERASE BUFFERS (DEFAULT)    X
               ENABLTO=2.2,          LEASED LINE ONLY (DEFAULT)        X
               MODEL=3705-2,         .                                 X
               DELAY=(0.2),                                            X
               NEWNAME=EFXNCP2,      NAME OF THIS LOAD MODULE          X
               OLT=NO,               ONLINE TEST AVAILABLE(DEFAULT)    X
               SLODOWN=12,           SLOWDOWN WHEN 12% OF BUFFERS AVAIL X
               SUBAREA=3,            SUBAREA ADDRESS = 3               X
               VRPOOL=6,                                               X
               TRACE=(YES,10)        10 ADDRESS-TRACE ENTRIES
         EJECT
*********************************************************************
*      SYSCNTRL OPTIONS FOR VTAM OR TCAM                            *
*      NOTE THAT OPERATOR CONTROLS ARE NOT INCLUDED.                *
*********************************************************************
NCPSYSC  SYSCNTRL OPTIONS=(MODE,                                       X
               RCNTRL,RCOND,RECMD,RIMM,ENDCALL,                        X
```

```
               BHSASSC)
         EJECT
*************************************************************************
*      HOST MACRO SPECIFICATIONS OS VTAM                                *
*      UNITSZ TIMES MAXBFRU MINUS BFRPAD EQUALS MAX MESSAGE SIZE        *
*      FOR INBOUND MESSAGES                                             *
*************************************************************************
NCPHOST  HOST  INBFRS=25,          INITIAL 3705 ALLOCATION              X
               MAXBFRU=25,         VTAM BUFFER UNIT ALLOCATION          X
               BFRPAD=0,                                                X
               UNITSZ=256,                                              X
               SUBAREA=1,           SUBAREA ADDRESS = 1                 X
               TIMEOUT=(120.0)     AUTO SHUT DOMN IF NO RESP IN 120SEC
         EJECT
*************************************************************************
*      CSB MACRO SPECIFICATIONS                                         *
*************************************************************************
NCPCSB   CSB   SPEED=(2400),       BUS MACH CLOCK                       X
               MOD=0,              SCANNER ADDRESS 000 TO 01F           X
               TYPE=TYPE2          TYPE 1 COMM SCANNER
         EJECT
*************************************************************************
*      PATH SPECIFICATIONS                                              *
*************************************************************************
NCP03   PATH  DESTSA=1,                                                 X
               ER1=(1,1)
         EJECT
*************************************************************************
*      SPECIFICATIONS FOR SDLC LEASED LINES                             *
*      GROUP MACRO SPECIFICATIONS                                       *
*************************************************************************
SDLCGPL GROUP LNCTL=SDLC,          SYNCHRONOUS DATA LINK                X
               DIAL=NO,            REQUIRED FOR LEASED LINE             X
               REPLYTO=1.0,        USE DEFAULT                          X
               TYPE=NCP            NCP ONLY
        SPACE  2
*************************************************************************
*      LINE MACRO SPECIFICATION - FULL-DUPLEX, LEASED                   *
*      MAY BE USED FOR 3790, 3600, OR 3650                              *
*                                                                       *
*      NOTE: LINE SPEED MAY BE RAISED TO 2400 FOR                       *
*      ALL PHYSICAL UNITS AND TO 4800 FOR 3600 AND 3650                 *
*      WITHOUT DOING A NEW GEN OF NCP.                                  *
*      RETRIES VALUE FOR LINE SHOULD BE GREATER THAN 30                 *
*      SECONDS AND LESS THAN ONE MINUTE FOR 3650.                       *
*                                                                       *
*************************************************************************
SDLC01   LINE  ADDRESS=020,        TRANSMIT AND RECEIVE ADDRESSES       X
               DUPLEX=HALF,        MODEM IS STRAPPED FOR FULL DUPLEX    X
               SPEED=56000,        SPEED MAY BE HIGHERCSEE NOTES)       X
               NRZI=NO,            SPECIFY YES ONLY IF REQUIRED         X
               NEWSYNC=NO,         CHECK MODEM REQUIREMENTS             X
               CLOCKNG=EXT,        MODEM PROVIDES CLOCKING              X
               RETRIES=(5,10,4)    5 RETRIES PER RECOVERY SEQUENCE
         SPACE 2
*************************************************************************
*      SERVICE ORDER FOR SDLC LINK                                      *
*************************************************************************
```

```
         SERVICE ORDER=(SDLCPU01)
         EJECT
*********************************************************************
*      PHYSICAL UNIT SPECIFICATIONS                                 *
*********************************************************************
SDLCPU01 PU    ADDR=C1,           POLL ADDRESS                      X
               PUTYPE=2,                                            X
               ISTATUS=ACTIVE,                                      X
               MODETAB=ISTINCLM,                                    X
               SSCPFM=USS3270,                                      X
               USSTAB=ISTINCDT,                                     X
               MAXOUT=7,          MAX PATH INFO UNITS BEFORE RESPONSE X
               MAXDATA=1024,      MAXIMUM AMOUNT OF DATA            X
               PASSLIM=7,         .                                 X
               PACING=0,          FOR DISPLAYS AND DSC PRINTERS     X
               VPACING=0,         FOR DISPLAYS AND DSC PRINTERS     X
               DISCNT=(NO),       .                                 X
               RETRIES=(,1,4)     4 RETRIES, 1 SECOND BETWEEN
         SPACE 2
*********************************************************************
*      LOGICAL UNIT SPECIFICATIONS                                  *
*********************************************************************
SDLCLU01 LU LOCADDR=2,                                              X
               USSTAB=MVSUSS,                                       X
               DLOGMOD=D4C32782,                                    X
               ISTATUS=ACTIVE
SDLCLU02 LU LOCADDR=3,                                              X
               USSTAB=MVSUSS,                                       X
               DLOGMOD=D4C32782,                                    X
               ISTATUS=INACTIVE
SDLCLU03 LU LOCADDR=4,                                              X
               DLOGMOD=D4C32782,                                    X
               ISTATUS=INACTIVE
SDLCLU04 LU LOCADDR=5,                                              X
               DLOGMOD=D4C32782,                                    X
               ISTATUS=INACTIVE
         EJECT
*********************************************************************
*      GENEND DELIMITER                                             *
*********************************************************************
         GENEND
         END
```

d) Multi-line NCP

```
*********************************************************************
*                                                                   *
*      ACF/NCP V3                                                   *
*      THIS GENERATION IS FOR AN IBM 3705-II                        *
*                                                                   *
*********************************************************************
         SPACE 2
*********************************************************************
*      PCCU SPECIFICATIONS - OS/VS (VTAM ONLY)                      *
*********************************************************************
NCPSTART PCCU  CUADDR=5A0,         3705 CONTROL UNIT ADDRESS        X
               AUTODMP=NO,         PROMPT BEFORE DUMPING NCP        X
               AUTOIPL=NO,         NO AUTOIPL AND RESTART           X
```

```
              LOADSTA=5A0-S,                                          X
              DUMPSTA=5A0-S,                                          X
              DUMPDS=NCPDUMP,     AUTODUMP REQUESTED                  X
              SUBAREA=1,                                              X
              CHANCON=COND,                                           X
              OWNER=NCPHOST,                                          X
              VFYLM=YES,                                              X
              MAXDATA=4096,                                           X
              INITEST=NO          NCP INITIALIZATION TEST
         EJECT
*************************************************************************
*      BUILD MACRO SPECIFICATIONS FOR OS                                *
*************************************************************************
NCPBUILD BUILD MAXSUBA=31,          MUST BE SAME AS IN VTAM STR DEF    X
              LOADLIB=NCPLIB,       LIBRARY FOR NCP LOAD MODULE        X
              QUALIFY=SYS1,         1ST LEVEL QUALIFIER                X
              VERSION=V3,                                              X
              TYPSYS=OS,                                               X
              MEMSIZE=256,          3705 STORAGE SIZE IS 256K          X
              TYPGEN=NCP,           NCP ONLY                           X
              MAXSSCP=2,                                               X
              NUMHSAS=2,                                               X
              BFRS=88,              NCP BUFFER SIZE                    X
              CA=(TYPE2),           CA 1 IS TYPE 2                     X
              NCPCA=(ACTIVE),       CA 1 ACTIVE                        X
              ERASE=NO,             DO NOT ERASE BUFFERS (DEFAULT)     X
              ENABLTO=2.2,          LEASED LINE ONLY (DEFAULT)         X
              MODEL=3705-2,         .                                  X
              DELAY=(0.2),                                             X
              NEWNAME=N01A,         NAME OF THIS LOAD MODULE           X
              OLT=NO,               ONLINE TEST AVAILABLE(DEFAULT)     X
              SLODOWN=12,           SLOWDOWN WHEN 12% OF BUFFERS AVAIL X
              SUBAREA=3,            SUBAREA ADDRESS = 3                X
              VRPOOL=6,                                                X
              TRACE=(YES,10)        10 ADDRESS-TRACE ENTRIES
         EJECT
*************************************************************************
*      SYSCNTRL OPTIONS FOR VTAM OR TCAM                                *
*      NOTE THAT OPERATOR CONTROLS ARE NOT INCLUDED.                    *
*************************************************************************
NCPSYSC  SYSCNTRL OPTIONS=(MODE,                                        X
              RCNTRL,RCOND,RECMD,RIMM,ENDCALL,                         X
              BHSASSC)
         EJECT
*************************************************************************
*      HOST MACRO SPECIFICATIONS OS VTAM                                *
*      UNITSZ TIMES MAXBFRU MINUS BFRPAD EQUALS MAX MESSAGE SIZE        *
*      FOR INBOUND MESSAGES                                             *
*************************************************************************
NCPHOST  HOST  INBFRS=25,           INITIAL 3705 ALLOCATION            X
              MAXBFRU=25,           VTAM BUFFER UNIT ALLOCATION        X
              BFRPAD=0,                                                X
              UNITSZ=256,                                              X
              SUBAREA=1,            SUBAREA ADDRESS = 1                X
              TIMEOUT=(120.0)     AUTO SHUT DOMN IF NO RESP IN 120SEC
         EJECT
*************************************************************************
*      CSB MACRO SPECIFICATIONS                                         *
```

```
*************************************************************************
NCPCSB   CSB   SPEED=(2400),       BUS MACH CLOCK                       X
               MOD=0,              SCANNER ADDRESS 000 TO 01F           X
               TYPE=TYPE2          TYPE 1 COMM SCANNER
         EJECT
*************************************************************************
*      PATH SPECIFICATIONS                                              *
*************************************************************************
NCP03    PATH  DESTSA=1,                                                X
               ER1=(1,1)
         EJECT
*************************************************************************
*      SPECIFICATIONS FOR SDLC LEASED LINES                             *
*      GROUP MACRO SPECIFICATIONS                                       *
*************************************************************************
SDLCGPL GROUP LNCTL=SDLC,          SYNCHRONOUS DATA LINK                X
               DIAL=NO,            REQUIRED FOR LEASED LINE             X
               REPLYTO=1.0,        USE DEFAULT                          X
               TYPE=NCP            NCP ONLY
         SPACE  2
*************************************************************************
*      LINE MACRO SPECIFICATION - FULL-DUPLEX, LEASED                   *
*      MAY BE USED FOR 3790, 3600, OR 3650                              *
*                                                                       *
*      NOTE: LINE SPEED MAY BE RAISED TO 2400 FOR                       *
*      ALL PHYSICAL UNITS AND TO 4800 FOR 3600 AND 3650                 *
*      WITHOUT DOING A NEW GEN OF NCP.                                  *
*      RETRIES VALUE FOR LINE SHOULD BE GREATER THAN 30                 *
*      SECONDS AND LESS THAN ONE MINUTE FOR 3650.                       *
*                                                                       *
*************************************************************************
SDLC01   LINE  ADDRESS=020,        TRANSMIT AND RECEIVE ADDRESSES       X
               DUPLEX=HALF,        MODEM IS STRAPPED FOR FULL DUPLEX    X
               SPEED=9600,         SPEED                                X
               NRZI=NO,            SPECIFY YES ONLY IF REQUIRED         X
               NEWSYNC=NO,         CHECK MODEM REQUIREMENTS             X
               CLOCKNG=EXT,        MODEM PROVIDES CLOCKING              X
               ISTATUS=ACTIVE,                                          X
               RETRIES=(5,10,4)    5 RETRIES PER RECOVERY SEQUENCE
         SPACE 2
*************************************************************************
*      SERVICE ORDER FOR SDLC LINK                                      *
*************************************************************************
         SERVICE ORDER=(SDLCPU01)
         EJECT
*************************************************************************
*      PHYSICAL UNIT SPECIFICATIONS                                     *
*************************************************************************
SDLCPU01 PU    ADDR=C1,           POLL ADDRESS                          X
               PUTYPE=2,                                                X
               ISTATUS=ACTIVE,                                          X
               MODETAB=ISTINCLM,                                        X
               SSCPFM=USS3270,                                          X
               USSTAB=ISTINCDT,                                         X
               MAXOUT=7,          MAX PATH INFO UNITS BEFORE RESPONSE   X
               MAXDATA=1024,      MAXIMUM AMOUNT OF DATA                X
               PASSLIM=7,         .                                     X
               PACING=0,          FOR DISPLAYS AND DSC PRINTERS         X
```

```
               VPACING=0,         FOR DISPLAYS AND DSC PRINTERS        X
               DISCNT=(NO),       .                                    X
               RETRIES=(,1,4)     4 RETRIES, 1 SECOND BETWEEN
         SPACE 2
*********************************************************************
*      LOGICAL UNIT SPECIFICATIONS                                  *
*********************************************************************
SDLCLU01 LU LOCADDR=2,                                               X
               USSTAB=MVSUSS,                                        X
               DLOGMOD=D4C32782,                                     X
               ISTATUS=ACTIVE
SDLCLU02 LU LOCADDR=3,                                               X
               USSTAB=MVSUSS,                                        X
               DLOGMOD=D4C32782,                                     X
               ISTATUS=INACTIVE
SDLCLU03 LU LOCADDR=4,                                               X
               DLOGMOD=D4C32782,                                     X
               ISTATUS=INACTIVE
SDLCLU04 LU LOCADDR=5,                                               X
               DLOGMOD=D4C32782,                                     X
               ISTATUS=INACTIVE
         EJECT
*********************************************************************
*      LINE MACRO SPECIFICATION - FULL-DUPLEX, LEASED               *
*      MAY BE USED FOR 3790, 3600, OR 3650                          *
*                                                                   *
*      NOTE: LINE SPEED MAY BE RAISED TO 2400 FOR                   *
*      ALL PHYSICAL UNITS AND TO 4800 FOR 3600 AND 3650             *
*      WITHOUT DOING A NEW GEN OF NCP.                              *
*      RETRIES VALUE FOR LINE SHOULD BE GREATER THAN 30             *
*      SECONDS AND LESS THAN ONE MINUTE FOR 3650.                   *
*                                                                   *
*********************************************************************
SDLC02   LINE  ADDRESS=021,        TRANSMIT AND RECEIVE ADDRESSES    X
               DUPLEX=HALF,        MODEM IS STRAPPED FOR FULL DUPLEX X
               SPEED=9600,         SPEED MAY BE HIGHERCSEE NOTES)    X
               NRZI=NO,            SPECIFY YES ONLY IF REQUIRED      X
               NEWSYNC=NO,         CHECK MODEM REQUIREMENTS          X
               CLOCKNG=EXT,        MODEM PROVIDES CLOCKING           X
               ISTATUS=ACTIVE,                                       X
               RETRIES=(5,10,4)    5 RETRIES PER RECOVERY SEQUENCE
         SPACE 2
*********************************************************************
*      SERVICE ORDER FOR SDLC LINK                                  *
*********************************************************************
         SERVICE ORDER=(SDLCPU02)
         EJECT
*********************************************************************
*      PHYSICAL UNIT SPECIFICATIONS                                 *
*********************************************************************
SDLCPU02 PU    ADDR=C1,            POLL ADDRESS                      X
               PUTYPE=2,                                             X
               ISTATUS=ACTIVE,                                       X
               MODETAB=ISTINCLM,                                     X
               SSCPFM=USS3270,                                       X
               USSTAB=ISTINCDT,                                      X
               MAXOUT=7,           MAX PATH INFO UNITS BEFORE RESPONSE X
               MAXDATA=1024,       MAXIMUM AMOUNT OF DATA            X
```

```
               PASSLIM=7,         .                                      X
               PACING=0,          FOR DISPLAYS AND DSC PRINTERS          X
               VPACING=0,         FOR DISPLAYS AND DSC PRINTERS          X
               DISCNT=(NO),       .                                      X
               RETRIES=(,1,4)     4 RETRIES, 1 SECOND BETWEEN
         SPACE 2
*************************************************************************
*      LOGICAL UNIT SPECIFICATIONS                                      *
*************************************************************************
SDLCLU05 LU LOCADDR=2,                                                  X
               USSTAB=MVSUSS,                                           X
               DLOGMOD=D4C32782,                                        X
               ISTATUS=ACTIVE
SDLCLU06 LU LOCADDR=3,                                                  X
               USSTAB=MVSUSS,                                           X
               DLOGMOD=D4C32782,                                        X
               ISTATUS=INACTIVE
         EJECT
*************************************************************************
*      GENEND DELIMITER                                                 *
*************************************************************************
         GENEND
         END
```