```
                        ************  ****  *****           ||
                        **  **  **    **    **             |||
                        **  **  **    **    **            ||||
                        **            **    **            || ||
    |1      _,,,---,,_   **            ** **             || ||
ZZZzz /,'.-'`'    -.  ;-;;,   **       ****               ||  ||
    |,4-  ) )-,_. ,( (  ''-'  **       *****             ||  ||
   '---''(_/--'  `-')_)        **      ** **            ||  ||  ||||||||||
                        **            **   **          ||||||||||||
     The MVS 3.8j       **            **    **            ||
    Tur(n)key System    **            **     **           ||
                        ******       ****    ***        ||||||
```

```
             TK3 created by Volker Bandke       vbandke@bsp-gmbh.com
             TK4- update by Juergen Winkelmann  winkelmann@id.ethz.ch
                    see TK4-.CREDITS for complete credits

                         MVS 3.8j Level 8505

    Logon ===>

                                                     RUNNING  TK4-
```

The MVS 3.8j Tur(n)key 4- System

OS/VS2 MVS 3.8j Service Level 8505

Tur(n)key Level 4- Version 1.00

User's Manual

November 2013

```
*********************************************************************
*                                                                   *
* This User's Manual applies to the MVS 3.8j Tur(n)key 4- System.   *
*                                                                   *
*********************************************************************
*                                                                   *
* MVS 3.8j Tur(n)key 4- ("TK4-") is a ready to use OS/VS2 MVS 3.8j  *
* system built specifically to run under the Hercules System/370,   *
* ESA/390, and z/Architecture Emulator. It is an extension of the   *
* original MVS Tur(n)key Version 3 System ("TK3") created by Volker *
* Bandke in 2002. See Appendix A for credits and copyrights.        *
*                                                                   *
* Note: TK4- does not claim to be a new release of the original TK3 *
*       system, hence its name is TK4-, not TK4.                    *
*                                                                   *
*********************************************************************
*                                                                   *
* Jürgen Winkelmann, winkelmann@id.ethz.ch, November 2013           *
*                                                                   *
*********************************************************************
```

2

Table of Contents

Introduction

MVS 3.8j Tur(n)key 4- ("TK4-") is a ready to use OS/VS2 MVS 3.8j system built specifically to run under the Hercules System/370, ESA/390, and z/Architecture Emulator. It is an extension of the original MVS Tur(n)key Version 3 System ("TK3") created by Volker Bandke in 2002 (see Appendix A: About the MVS 3.8j Tur(n)key 4- System on page 28 for credits and copyrights).

Although TK4- incorporates many updates listed on Volker's Tur(n)key # 4 Wishlist or found on other Tur(n)key update or "needed extras" systems, it is not related to any of them and is in no way meant to be a new release of the original TK3 system; hence its name is **TK4-**, not TK4.

TK4- is a personal preference of the author on how to operate and maintain a vintage MVS system:

- Automated system startup and shutdown procedures
- Unattended operations
- Just enough security to be sure that regular users cannot damage the system unintentionally
- All modifications to SMP controlled elements implemented as SMP user modifications
- Reliable procedures for removal and reapplication of all user modifications to provide a clean environment for IOGENs

The original intention was to replace a publicly accessible TK3 system implemented by the author in 2009 with an easier to maintain and more robust one, while bringing functionality up to a level comparable with other TK3 updates. So, in the beginning a publication as a Tur(n)key style system was not envisioned at all. Nonetheless tools updated by the author while creating the new system were published standalone in the Yahoo H390-MVS and turnkey-mvs groups and are intended to be published on CBT too, once the system is complete.

Along the way, however, many diversions occurred, leading to the development of tools and concepts, not all of which being independent enough from the system to allow for a meaningful standalone distribution. This finally lead to the decision to publish the system as a whole in Tur(n)key style.

A major diversion was the exploitation of the connectivity options MVS 3.8j provides when running under Hercules:

- 3x74 attached local non-SNA 3270 terminals controlled by VTAM or TCAM.
- 3791L attached local SNA 3270 and 3767 terminals controlled by VTAM or TCAM.
- 3705 NCP attached remote SNA 3270 and 3767 terminals controlled by VTAM or TCAM.
- 2703 TCU controlled asynchronous lines connecting 3335 (TWX) or 2741 terminals to TCAM.
- 2703 TCU controlled bisynchronous lines connecting RJE stations to JES2.
- Kermit file transfer through 3767 SNA terminals controlled by VTAM.

The above connectivity options require specific I/O devices to be generated, which is out of scope for most users of the Tur(n)key systems currently available. Besides having these

devices readily generated, TK4- has configurations (TCAM, VTAM, JES2) and user modifications in place to support them.

The integration of these connectivity options into a Tur(n)key system makes them available to a broad audience: There is no MVS systems programming knowledge required to use them, as opposed to the in depth knowledge that would be needed to get them working if the configurations and the user modifications were just published standalone.

While the 3705 NCP and the 3791L emulations are still in a proof of concept state on the Hercules side, TK4- is a system enabling their full exploitation. Consequently it may well serve as a test bed for any further development of these emulations.

The skills needed to enhance these emulations (C-Programming, Hercules development, SNA concepts) differ greatly from those needed to create an MVS system exploiting them (MVS systems programming, S/370 basic assembler language, TCAM and VTAM programming). So, TK4- could in fact be the enabler when it comes to bringing these emulations to a new level.

The following chapters provide basic information on how to use the MVS 3.8j TK4- system. They focus on the specific setup of the system and will generally not duplicate information available through other sources. It is strongly recommended to refer to the original IBM documentation for more details concerning OS/VS2-MVS 3.8j and its components. Today, quite a few websites (bitsavers, softlib, etc.) are providing access to vintage manuals in various formats. A comprehensive collection of links to those manuals can be found on http://tk3.limewebs.com/Vintage_Manuals.html. In addition the "New User's Cookbook" (http://www.bsp-gmbh.com/turnkey/cookbook) written by Volker Bandke for his original "MVS Tur(n)key System, Version 3" is a comprehensive resource covering those aspects of the TK4- system that have been taken over from TK3 unchanged.

As of the publishing date of TK4- the applicable Hercules documentation can be found on http://hercdoc.glanzmann.org, section "V4.00 (Upcoming version)". Most probably that link will change once Hercules Version 4.00 has been released officially.

Installation

MVS 3.8j TK4- is comprised of three ZIP archives:

- **`tk4-.zip`**: The ready to run MVS 3.8j TK4- system.
- **`tk4-source.zip`**: The source volumes (SRCCAT, SRC000, SRC001, SRC002) that come with Volker's Tur(n)key 3 system. Because the TK4- system has RAKF installed and activated, the RAC indicator of all datasets on these volumes has been turned on. Otherwise they are fully identical to the ones distributed with TK3. These volumes are not needed to run the system; consequently it is optional to download `tk4-source.zip`. However, they are useful when it comes to developing user modifications (although the source doesn't exactly reflect the running system).
- **`tk4-cbt.zip`**: The CBT volumes (CBTCAT, CBT000, CBT001, CBT002) that come with Volker's Tur(n)key 3 system. Because the TK4- system has RAKF installed and activated, the RAC indicator of all datasets on these volumes has been turned on. Otherwise they are fully identical to the ones distributed with TK3. These volumes are not needed to run the system; consequently it is optional to download `tk4-cbt.zip`.

However, they come in handy to have a quick look at old CBT contents without needing to download and receive the files from http://www.cbttape.org.

To install proceed as follows:

- Unzip the `tk4-.zip` archive to an arbitrary folder. This folder will be referred to as the `tk4-` folder from now on.
- If the optional source volumes are to be installed unzip the `tk4-source.zip` archive to the `tk4-` folder. Allow your unzip utility to overwrite existing files and to merge into existing folders while unzipping the archive.
- If the optional cbt volumes are to be installed unzip the `tk4-cbt.zip` archive to the `tk4-` folder. Allow your unzip utility to overwrite existing files and to merge into existing folders while unzipping the archive.

This concludes the installation.

Note: The datasets on the optional source and CBT volumes are cataloged in their own user catalogs pointed to by aliases from the system's master catalog. TK4- comes with these user catalogs being disconnected, to prevent inadvertent mount requests being issued against the optional volumes on systems having them not installed.

Installing the optional volumes as described above makes them physically available only. It does not connect the respective user catalogs, which needs to be done when the system is running. "Optional Source and CBT Volumes" on page 18 has instructions on how to connect the user catalogs.

Getting Started

This chapter presents automated procedures to operate an MVS 3.8j TK4- system on a Windows or Linux host and provides basic information on how to logon and logoff a TSO user session using tn3270 terminal emulation.

No Hercules or OS/VS2-MVS 3.8j skills are required to follow the instructions given in this chapter. To be as straightforward as possible technical information is kept to a minimum. For technical details refer to the "Reference Information" chapters starting at page 11.

Start the System

On a Windows system open the `tk4-` folder and click (or double click, depending on your settings) the `mvs.bat` file.

> **Note:** A message stating that MSVCR100.dll is missing might pop up after clicking the `mvs.bat` file. This means that a Microsoft runtime library is missing. In this case download and install
>
> http://www.microsoft.com/download/en/details.aspx?id=5555 for 32-bit systems
> http://www.microsoft.com/download/en/details.aspx?id=14632 for 64-bit systems

On a Linux system open a shell window, change directory to the `tk4-` folder and enter the command

`./mvs`

at the shell prompt.

System startup is fully unattended. After powering on an emulated IBM 3033 mainframe, an automated IPL is performed bringing the system up to full usability.

Note that for technical reasons the startup procedure needs to pause a few times for up to 30 seconds. This is normal behavior which doesn't indicate an error condition. Simply wait until the following logo is displayed, signaling the end of the startup procedure:

```
HHC01603I *                           ***********   ****  *****           ||
HHC01603I *                           **  **  **    **    **             |||
HHC01603I *                           **  **  **    **    **            ||||
HHC01603I *                           **          **  **            || ||
HHC01603I *        |1      _,,,---,,_       **          ** **            ||  ||
HHC01603I * ZZZzz /,'.-'`'    -.  ;-;;,     **          ****            ||   ||
HHC01603I *      |,4-  ) )-,_. ,( (  ''-'   **          *****          ||    ||
HHC01603I *     '---''(_/--'  `-')_)        **          ** **        ||      ||    ||||||||||
HHC01603I *                                **          **  **      ||||||||||||||
HHC01603I *        The MVS 3.8j            **          **  **              ||
HHC01603I *      Tur(n)key System          **          **   **             ||
HHC01603I *                                ******   ****    ***      ||||||
HHC01603I *
HHC01603I *           TK3 created by Volker Bandke      vbandke@bsp-gmbh.com
HHC01603I *           TK4- update by Juergen Winkelmann  winkelmann@id.ethz.ch
HHC01603I *                  see TK4-.CREDITS for complete credits
```

Do not try to enter anything in the window displaying the console log. The system is operating fully unattended, the log is output only. In general it is not expected that any console commands need to be entered when the system is operating in unattended mode.

If more control is desired see the "Reference Information" chapters starting at page 11 for information on how to activate full function consoles or to operate the system manually.

Logon to TSO

Like the original Tur(n)key 3 system TK4- comes with four TSO users predefined, in addition to IBMUSER, which is the system's initial user. TK4-, however, has resource access control (RAC) activated by means of RAKF, the RAcK ofF security system, being a replacement for IBM's well known RACF product. Due to this fact the TSO users have slightly different definitions than their TK3 counterparts:

- HERC01 is a fully authorized user with full access to the RAKF users and profiles tables. The logon password is CUL8TR.
- HERC02 is a fully authorized user without access to the RAKF users and profiles tables. The logon password is CUL8TR.
- HERC03 is a regular user. The logon password is PASS4U.
- HERC04 is a regular user. The logon password is PASS4U.
- IBMUSER is a fully authorized user without access to the RAKF users and profiles tables. The logon password is IBMPASS. This account is meant to be used for recovery purposes only.

To logon perform the following steps:

1. Connect a tn3270 emulator of your choice to port 3270 of the system running TK4- (which typically will be localhost).

- If, for the current IPL, this is the first connection to the terminal address selected by Hercules, a panel showing the TK4- logo and information about Hercules and the host operating system will be displayed. In this case press the 3270 RESET key followed by the CLEAR key to display the logon panel (RESET is needed if the keyboard is locked only).
- Otherwise the logon panel is displayed immediately.

Continue to step 2 once the logon panel is displayed:

```
Terminal   CUU0C0                                              Date  01.08.13
                                                               Time  13:29:26

                              ***********   ****  *****                  |
                              **   **   **   **    **                    ||
                              **   **   **   **    **                   |||
                                   **          **  **                  ||||
            |l   _,,,---,,_        **          ** **                  |||||
   ZZZzz /,`.-'`'    -.  ;-;;,     **          ****                  ||||||
         |,4-  ) )-,_..;,( (  ''-'  **          *****           ||  |||||||   |||||||||
        '---''(_/--'  `-')_)        **          ** **          |||||||| |||
                                    **          **  **
         The MVS 3.8j               **          **   **
         Tur(n)key System           **          **    **        |||||
                              ******    ****      ***           || |||

           TK3 created by Volker Bandke       vbandke@bsp-gmbh.com
           TK4- update by Juergen Winkelmann  winkelmann@id.ethz.ch
                    see TK4-.CREDITS for complete credits

                          MVS 3.8j Level 8505

Logon ===> _
                                                       RUNNING  TK4-
```

2. Enter the name of the user to logon at the cursor position and press ENTER. If prompted enter the password and press ENTER.
3. After the "Welcome to TSO" banner has been displayed press ENTER. The system will entertain you with a fortune cookie. Press ENTER again.

4. The system will now display the following `TSO Applications` menu:

```
Terminal  CUU0C0                                            Date  23.11.13
System    TK4-                                              Time  16:30:35
TSO User  HERC01

Option ===> 1


              The MVS 3.8j Tur(n)key System
                  TK Level 4- PUT 8505

                     TSO Applications


      1   RFE        "SPF like" productivity tool
      2   RPF        "SPF like" productivity tool
      3   IM         IMON/370 system monitor
      4   QUEUE      spool browser
      5   HELP       general TSO help
      6   UTILS      information on utilities and commands available
      7   TERMTEST   verify 3270 terminal capabilities


 PF3=Exit
```

From this menu the main TSO applications can be accessed by entering the appropriate item number in the `Option` field. Pressing `PF3` will exit to the TSO `READY` prompt, allowing the full TSO functionality to be accessed.

Change TSO Logon Password

A TSO user's logon password can be changed at logon time by entering `oldpw/newpw` (i.e. the current password, followed by a slash, followed by the new password) when replying to the "`ENTER CURRENT PASSWORD FOR user-`" prompt. The new password gets activated immediately.

Logoff a TSO Session

To logoff perform the following steps:

1. Exit any active application and press `PF3` from the `TSO Applications` menu to exit to the `READY` prompt.
2. Enter `logoff` and press `ENTER`. The tn3270 session will not drop and the logon panel will be redisplayed. Disconnect the tn3270 session manually if you don't want to logon again or enter a userid to relogon.

Stop the System

To bring the system to an orderly halt perform the following steps:

1. Logon TSO user HERC01 or HERC02.
2. Press `PF3` from the `TSO Applications` menu to exit to the `READY` prompt.
3. Type `shutdown` and press `ENTER`.
4. Enter `logoff` and press `ENTER`.

After pausing 30 seconds the automated shutdown procedure will bring the system down and quit Hercules (which is equivalent to powering off the IBM 3033 mainframe).

Note: Any user having read access to the `DIAG8CMD` profile in the RAKF `FACILITY` class can initiate the shutdown sequence. Only HERC01 and HERC02 have this authority initially. If a

user without `DIAG8CMD` authority issues the `shutdown` command RAKF issues an error message to the MVS console and the shutdown procedure will not be initiated.

Reference Information

This chapter provides information specific to the TK4- implementation of OS/VS2-MVS 3.8j under the Hercules System/370, ESA/390, and z/Architecture Emulator. None of this information is needed to use and operate the TK4- system in unattended mode. Tasks like adding users, modifying authorizations, handling data on tape, modifying the system configuration, etc. may, however, require interaction with Hercules or the operating system.

Basic MVS and Hercules knowledge will be needed to use the information provided in this chapter, which is by no means intended to be an MVS or Hercules tutorial. IBM's original OS/VS2-MVS 3.8j documentation and the Hercules Version 4.00 documentation should be consulted for in depth information.

Today, quite a few websites (bitsavers, softlib, etc.) provide access to vintage manuals in various formats. A comprehensive collection of links to those manuals can be found on http://tk3.limewebs.com/Vintage_Manuals.html.

As of the publishing date of TK4- the applicable Hercules documentation can be found on http://hercdoc.glanzmann.org, section "V4.00 (Upcoming version)". Most probably that link will change once Hercules Version 4.00 has been released officially.

Hercules Configuration Files

TK4- uses a single master configuration file to define the Hercules configuration variants for all combinations of operational use (unattended or manual), optional source or CBT DASD being present or not, and host operating system (use CRLF print mode on Windows). The numerous configuration variants are created using variable substitution and include files in the master configuration file.

The master configuration file is named `tk4-.cnf` and can be found, together with all include files defined by TK4-, in folder `tk4-/conf`. It is not expected that the TK4- user will need to change any of these files. Instead, there are 10 empty configuration files defined in folder `tk4-/local_conf`. These are included at the end of the master configuration file and should be used to apply user modifications.

Hercules Scripts

TK4- uses Hercules scripts for system initialization and unattended operations. These scripts can be found in folder `tk4-/conf`. It is not expected that the TK4- user will need to change any of these scripts. Instead, there are 10 empty scripts defined in folder `tk4-/local_scripts`, which are executed

- after Hercules initialization, when operating in manual mode
- after MVS 3.8j initialization, when operating in unattended mode

These scripts should be used to perform any user specific processing.

System Consoles

The TK4- system comes with two MVS console configurations:

- `tk4-/conf/intcons.cnf` has an integrated IBM 3215 console defined at `009`. When this configuration is in use all MVS console output will be displayed at the Hercules console. MVS console commands, however, can be issued if Hercules hasn't been started in daemon mode only. Because this configuration can be IPLed without needing to connect any external console, it is used for unattended operations.

   Note that the scripts provided for unattended operations (`mvs` on Linux systems and `mvs.bat` on Windows systems) start Hercules in daemon mode. This means that the Hercules console is output only and consequently neither Hercules nor MVS console commands can be entered. In daemon mode the only way to enter commands is through the Hercules HTTP server as described in "Using the Hercules HTTP Server for Console Command Input" on page 13.

   This behavior can be changed as follows:

   - ➤ Prevent Hercules from starting in daemon mode:
      - On a Windows system: Open the `tk4-/unattended` folder and click (or double click, depending on your settings) the `set_console_mode.bat` file.
      - On a Linux system: Open a shell window, change directory to the `tk4-/unattended` folder and enter the command `./set_console_mode` at the shell prompt.

   The system will confirm that console mode has been activated. Running the `mvs` (Linux) and `mvs.bat` (Windows) scripts will start Hercules with a full console from now on. A currently running Hercules instance, however, will not change its console mode.

   - ➤ Revert to starting Hercules in daemon mode:
      - On a Windows system: Open the `tk4-/unattended` folder and click (or double click, depending on your settings) the `set_daemon_mode.bat` file.
      - On a Linux system: Open a shell window, change directory to the `tk4-/unattended` folder and enter the command `./set_daemon_mode` at the shell prompt.

   The system will confirm that daemon mode has been activated. Running the `mvs` (Linux) and `mvs.bat` (Windows) scripts will start Hercules in daemon mode from now on. A currently running Hercules instance, however, will not change its console mode.

- `tk4-/conf/extcons.cnf` has two external consoles defined: An IBM 3270 at `010` and an IBM 3215 at `01F`. It is used by the `start_herc` (Linux) and `start_herc.bat` (Windows) scripts for manual operations.

   Note that many other combinations of consoles (external, internal, 3215, 3270) can be defined. The `tk4-/conf/extcons.cnf` configuration file contains additional console definitions as comments. Each combination of these consoles is valid as long as there is at least one console defined, amongst which there is no more than one 3215-C (internal) console.

Instead of editing `tk4-/conf/extcons.cnf` to define a different console configuration it is recommended to use one of the user definable configuration files in folder `tk4-/local_conf` as follows:

➢ To _add_ a console copy the corresponding statement from `tk4-/conf/extcons.cnf` to the local configuration file and remove the # from column one.

➢ To _remove_ a console add the line

```
detach cuu
```

into the local configuration file, where `cuu` is the device address (i.e. `010` or `01F`) of the console to be removed.

To IPL MVS all external consoles defined in the configuration need to be connected to console group CONS at port 3270, using a tn3270 client for IBM 3270 and a regular telnet client for IBM 3215 consoles. Unused consoles must be detached before IPL to avoid MVS running out of WTO buffers. Upon IPL MVS will select the first usable console in the sequence `010`, `011`, `01F`, `009` as its master console.

Using the Hercules HTTP Server for Console Command Input

Regardless of the MVS console configuration in use, there is an HTTP server listening at port 8038 of the system on which the TK4- Hercules instance is running (usually 127.0.0.1, aka localhost) allowing console communications even when running in daemon mode. This can be used to activate a full function console whenever one is needed.

Example: Add Full Function Console when Running in Unattended Mode

A typical use case when running unattended (i.e. MVS was started using the `mvs` or `mvs.bat` script) is to add a full function console if this becomes necessary later. Use the following steps to achieve this:

- Point a web browser to port 8038 of the host system running TK4-. This will typically be 127.0.0.1, aka localhost.
- Enter

```
attach 010 3270 CONS
```

in the command field of the web browser session.
- Connect a tn3270 emulator of your choice to port 3270 of the host system running TK4- (which typically will be localhost). Use CONS for the LUNAME (or equivalent) connection parameter of the tn3270 client. A panel showing the TK4- logo and information about Hercules and the host operating system will be displayed.
- Enter

```
/v 010,console,auth=all
```

in the command field of the web browser session. An MVS console will now be activated in the tn3270 session.

- It is recommended to press `PF11` at the newly activated console at this point. This will remove the annoying default display area which occupies most of the console's output area. Alternatively `PF23` can be used if in addition the popular `mn jobnames,t` and `mn sess,t` commands are to be issued.

IPL and Shutdown

Any IPL or shutdown method valid for an OS/VS2-MVS system running on real iron will, of course, work with the TK4- system. Thus the methods mentioned here are recommendations only, modify them as needed:

Unattended Operations

This is the method described in "Getting Started" on page 7. It is meant to enable a user to work interactively using TSO sessions or to submit batch jobs through card readers, without needing to know what is "under the hood". There is no console input required neither at the Hercules nor at the MVS level. Console interaction is nonetheless possible using the HTTP server listening at port 8038.

Manual Operations

This method provides full control over IPL, operations, and shut down. However, IPL and shutdown can optionally still be performed using the autopilot the same way as unattended operations do. For a manual startup perform the following steps:

- If necessary, adapt the configuration file `tk4-/conf/extcons.cnf` to your specific requirements as described in "System Consoles" on page 12 for the `tk4-/conf/extcons.cnf` MVS console configuration.
- Run the `tk4-\start_herc.bat` (Windows) or the `tk4-/start_herc` (Linux) script to start Hercules, which will open the Hercules console window displaying the TK4- logo.
- Connect *all* consoles defined in `tk4-/conf/extcons.cnf`.
- Enter `ipl 148` at the Hercules command prompt and press `RETURN`.
- When message

  ```
  IEA101A SPECIFY SYSTEM PARAMETERS FOR RELEASE 03.8 .VS2
  ```

  is displayed on the master console (which is the first usable console found in the sequence 010, 011, 01F, 009), simply press `ENTER` to continue using automatic startup with autopilot assistance.

  If, however, automatic startup is not desired, enter

  ```
  r 00,cmd=03
  ```

  before pressing `ENTER`. This selects the nonexistent parmlib member `COMMND03` (consequently yielding `NIP` messages `IEA301I` and `IEA208I`) and thus prevents any further initialization. MVS will now wait for start commands to be entered manually.
- If automatic startup was allowed in the previous step the system will now bring up JES2, the CMD subsystem, and the automated operator (BSPPILOT). Then it does some useful PFkey assignments on the active 3270 consoles and displays message

  ```
  +BSPSP99I - End of processing, MAXRC=0000
  ```

It is recommended to press `PF11` at the active 3270 consoles at this point. This will remove the annoying default display area which occupies most of the console's output area. Alternatively `PF23` can be used if in addition the popular `mn jobnames,t` and `mn sess,t` commands are to be issued.

The system waits for 30 seconds now. Then startup will then be continued to the same functional level as when running in unattended mode.

If, however, automatic startup is not desired, enter

`$ca,all`

within the 30 seconds wait interval to cancel.

To stop the system, perform the following steps:

- Terminate all system activity:
  - If the system had been started with autopilot assistance enter

    `f bsppilot,shutnow`

    at any console and wait for message

    `$HASP099 ALL AVAILABLE FUNCTIONS COMPLETE`

    (note that on 3270 consoles `PFKey 16` is assigned to display the text `F BSPPILOT,SHUT` in the command line, which can easily be completed by typing `now` and pressing `ENTER` to initiate the shutdown)

  - If the system had been started without autopilot assistance manually stop all started tasks and quiesce JES2 activity until message `$HASP099` gets displayed.
- Enter $PJES2 at the master console and wait for JES2 termination.
- Enter `Z EOD` at the master console.
- Enter `QUIESCE` at the master console. The Hercules console now confirms with message

  `HHC00809I Processor CP00: disabled wait state 000A0000 00000CCC`

  that the system is down.
- Regardless how the system was brought up and shut down, there will be no automatic Hercules "power off" in manual mode. After having shut down the MVS system it is recommended to enter `stopall`, then `sysclear`, and finally `quit` at the Hercules console to terminate Hercules.

Operating the System

The TK4- system is designed such that no console interactions are required during normal use. Of course there are exceptions, for example when dealing with tapes.

Volker's very comprehensive "New User's Cookbook" is highly recommended to learn about MVS and JES2 commands and other operational aspects. It can be found at http://www.bsp-gmbh.com/turnkey/cookbook/index.html.

JRP (JES2 Remote Print)

JRP (JES2 Remote Print) is a VTAM application that enables printing of JES2 output to 3270 printers. Because the original TK3 system doesn't have JRP installed, the rationale for providing JRP on TK4- and some of its operational aspects are described here.

JRP on TK4-

Today's MVS 3.8j systems, running on emulated hardware, have no real need for a tool like JRP: It can be seen as yet another method to obtain line printer output, where the more common methods are

- Viewing the line printer output files directly: `prt002.txt` (SYSOUT=X, when released), `prt00e.txt` (SYSOUT=A) or `prt00f.txt` (SYSOUT=Z) in folder `tk4-/prt`. This is particularly convenient when Hercules is running on the user's local system, probably the most common configuration.
- Defining a line printer as a socket device and connect a printing or formatting utility like HercPrt (http://www.softdevlabs.com/Hercules/hercprt.html). Besides conveniently connecting to Hercules instances running on remote systems this gives the flexibility to beautify the output inline, for example by creating a PDF file using the famous blue/green bar "paper" from the old days.

JRP converts spooled output from JES2 to a 3270 printer data stream and sends it via VTAM to a 3270 printer. A 3270 printer emulation (pr3287, PCOMM, etc.) connected through the Hercules console port to the 3270 printer logical unit can then format and print the data stream. Conceptually that's the same as connecting to a Hercules socket printer, except that the console port is used instead of a dedicated printer port and the client has to decode a 3270 data stream instead of receiving plain text. So, basically JRP adds complexity to the printing process without providing additional capabilities.

Why have it on TK4- then? There still are a few reasons:

- Nostalgia: In the old days, on real hardware, printing via JRP to a 3270 printer often was the only way to obtain output quickly, without having to go to the data center, or find a nearby RJE station. So, JRP was a very commonly used tool and amongst today's MVS 3.8j users there might well be a few who simply like it.
- JRP is a VTAM application. As implemented on TK4- it supports non SNA (LU0) printers and non SNA (LU0) or SNA (LU2) consoles. As such it is the only production style application on TK4- that can communicate with SNA (LU2) terminals and for which full source is available. Given that one of the major TK4- use cases is to provide a test bed for the exploitation of MVS 3.8j's SNA communication capabilities, JRP is a very relevant part of the system.

JRP can print to any 3270 device that is defined to VTAM as an LU0 3286 and to Hercules as a 3287 printer (i.e. it doesn't matter whether the device is sysgen'ed in MVS as a 3277 terminal or a 3286 printer). As an example, JRP is configured on TK4- to drive one printer, named PRT4, printing output from JES2 class G (SYSOUT=G in JCL) to the Hercules 3287 device connected to address 0C7. Although JRP and JES2 printer names are completely independent PRT4 was chosen, in line with the fact that PRT1, PRT2 and PRT3 are the printers defined to JES2.

To operate JRP, a 3270 terminal (the "JRP console") must be connected to the JRP console application and an authorized user must be logged on to it. The MVS console can be used to start and stop JRP only, not to operate JRP.

On the TK4- system JRP is started and stopped automatically when running in unattended mode, or when running in manual mode with autopilot assistance. The sample JRP printer PRT4, however, will come up drained after JRP has started. This is a precaution to avoid message flooding on the MVS console when class G output is available without a 3270 printer emulation being connected to 0C7.

So the minimum operational task that needs to be performed before being able to print through JRP is to start PRT4. The following procedure is recommended:

- Connect a 3270 printer emulation to the Hercules console port (this will usually be port 3270 on localhost) using an LUNAME of 0C7.
- Connect a VTAM controlled 3270 terminal to the JRP console application:
    - On a local non SNA (LU0) terminal showing the TK4- logon panel as described in item 1 on page 8 enter

      ```
      logon applid=cjrp
      ```

      in the Logon ===> field and press ENTER.

    - On an SNA (LU2) terminal bring up Volker's cat as described in item b) on page 25, enter

      ```
      #applid cjrp
      ```

      above the Enter logon command prompt and press ENTER twice.

  The CONTROL TERMINAL FACILITY logon panel will now be displayed.

- Enter the userid and the password of a user having read access to the JRPAUTH profile in the FACILITY class in the respective fields and press ENTER (as shipped with TK4- users HERC01 and HERC02 have this permission). The JRP console will now be displayed.
- Press PF12, PF1 and PF8 to activate the console's alternate screen size, have it receive unsolicited messages and start PRT4. The console can be logged off at any time by pressing PF3, i.e. it is not necessary to have it connected for printing. The printer will remain started until it is explicitly stopped by pressing PF9 on a JRP console.

Once printer `PRT4` has been started, all JES2 output spooled to class G will get printed through the 3287 printer session connected to `0C7`.

Further information about JRP operations and use can be obtained from the documentation in the JRP distribution library, which is a modified version of CBT file 755. Run job `JRPUPDT$` from `SYS2.CNTL` to create this library as `HERC01.JRP`.

Maintenance Concepts

No reinvention of the wheel: All the good ideas from TK3 are taken over unchanged unless stated otherwise here.

Optional Source and CBT Volumes

The datasets on the optional source and CBT volumes are cataloged in their own user catalogs pointed to by aliases from the system's master catalog. TK4- comes with these user catalogs being disconnected, to prevent inadvertent mount requests being issued against the optional volumes on systems having them not installed.

To make the optional volumes accessible through catalog search the respective user catalogs need to be connected and the high level qualifier aliases pointing to them need to be defined. Because the catalog structure is identical to the one used in the original TK3 system the original setup jobs can be used unmodified to do this:

- To make the CBT volumes accessible submit job `SYS1.SETUP.CNTL(MVS0170)`. It connects the `SYS1.UCAT.CBT` user catalog and defines the `CBT`, `CBTCOV`, `CBT072`, `CBT129`, `CBT249` and `CBT429` HLQ aliases.
- To make the source volumes accessible submit job `SYS1.SETUP.CNTL(MVS0200)`. It connects the `SYS1.UCAT.SRC` user catalog and defines the `MVSSRC` HLQ alias.

User Management

User Management differs slightly from the original TK3 system because TK4- enforces an enhanced security scheme using the RAKF resource access control system:

- All user definitions are kept in the RAKF users table `SYS1.SECURE.CNTL(USERS)`.
- User authentication is *always* required to access the system. That holds particularly true for batch jobs:
  - All batch jobs have to specify the `USER` and `PASSWORD` parameters on their `JOB` card.
  - However, batch jobs submitted from a TSO session by means of the TSO SUBMIT command (i.e. from a REVEDIT or a RPF EDIT session) get their `USER` and `PASSWORD` parameters added automatically through the `IKJEFF10` user exit. Thus there is no need to code them manually or store any user and password information in job control libraries. *In fact doing so is strongly discouraged!*
- Once a user has been defined in the RAKF users table and the table has been activated this user is known to the system. But that doesn't mean that it is allowed to use TSO. In addition to being defined in the RAKF users table a TSO user must also be defined in `UADS` as is done on non-RAC protected systems, because all user attributes except the password are still taken from `UADS`. To define a user in `UADS` it is recommended to submit job `SYS2.JCLLIB(ADDUSER)` after having defined the user to

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RAKF. The specifications for `ADDUSER` are exactly the same as in the original TK3 system.

- It is *not* recommended to use TK3's `SYS2.JCLLIB(ADDUSERP)` job as any passwords defined in `UADS` are ignored by RAKF.

RAKF Administration

Security for the TK4- system has been set up to be "just enough" to prevent regular users from performing destructive activities against the system or against other users' data, maliciously or inadvertently. In particular it is allowed for everyone to read anything on the system (except the RAKF users and profiles tables of course).

This easy to manage scheme is defined by the RAKF profiles found in `SYS1.SECURE.CNTL(PROFILES)`. Each set of profiles has, as a comment, added the equivalent commands that would have been issued on a RA**C**F protected system to achieve the same level of protection. With the help of these comments it should be possible to do basic adjustments intuitively. Note that initially HERC01 is the *only* user having access to the RAKF users and profiles tables.

Tightening security further, however, can be quite a task, as many probably know from RACF, the infamous big brother of RAKF.

For more information see the RAKF User's Guide, which can be unzipped in PDF or MS-Word format from `RAKF.SAMPLIB($DOC$ZIP)`.

Activating RAKF Table Changes

Any changes made to the RAKF users and profiles tables stored in `SYS1.SECURE.CNTL` will not become active until the in core copies of these tables have been replaced with the changed versions.

- To activate changes to the users table enter `S RAKFUSER` at an MVS console.
- To activate changes to the profiles table enter `S RAKFPROF` at an MVS console.

A re-IPL of the system will activate any changes also, but is of course not necessary.

Installed Programs

For many programs installed on TK3 there are later versions available. These have been installed if applicable. Also, some additional programs have been installed. To keep track of the installed programs and their versions the install files used are stored in ZIP format under HLQ `TK4-`, conveniently viewable using `REVIEW`. Also, member `UTILS` in `SYS2.HELP` has been updated whenever feasible to allow end users to find out what is on the system. `UTILS` can be accessed easily from option 6 of the `TSO Applications` menu.

In most cases the programs have been installed using the relevant materials with no or only minimal and obvious changes from the installers found under the `TK4-` HLQ. As a target for the installations, if not required otherwise, `SYS2.CMDLIB`, `SYS2.LINKLIB`, `SYS2.CMDPROC`, `SYS2.PROCLIB` and `SYS2.HELP` are used, depending on the respective object types.

If the installer's logic requires or suggests job control or source members to be stored on the system these are stored in `SYS2.CNTL` or `SYS2.ASM`, respectively. Also, any changes applied to the programs are kept in `SYS2.ASM`.

There may be overlaps between `SYS2.CNTL` or `SYS2.ASM` and the original TK3's `SYS1.SETUP.CNTL` or `SYS1.SETUP.ASM`. In these cases the versions from the `SYS2` libraries are the ones in effect.

Usermods

All usermods installed on the TK4- system are placed in `SYS1.UMODCNTL`. Those that are in TK3 already are reused with the same sysmod names. New usermods are always installed using the names of the original publisher, i.e. they are not renamed to the TK3 `ZUMnnnn` numbering scheme.

All `REJECT`, `RESTORE` and `SETRC` fiddling is removed from the usermod installation jobs in `SYS1.UMODCNTL`. Instead, jobs `REST-ALL` and `APPL-ALL` have been introduced to restore or apply all usermods (or selected ones by editing these jobs). There are rare situations in which the `SMP RESTORE` doesn't fully remove a usermod. To get a clean system all jobs in `SYS1.UMOD.RESTORE.CNTL` (currently only one) should be run after `REST-ALL`.

A note on usermod `ZJW0006`: This usermod has been created in the beginning of the work targeting the exploitation of the SNA LU1/2 connectivity given through the 3705 NCP emulation provided by comm3705.c. Its main purpose is to "recycle" certain VTAM controlled logical units (following a naming scheme) after each session, i.e. to issue `V NET,ACT` and `V NET,INACT` commands. Since then the LU1/2 support has been stabilized to a point, where recycling isn't needed any more. The VTAM setup has consequently been changed such that the `ZJW0006` automation no longer gets triggered and it thus could be removed from the system. However, it remained installed as an example on how to implement that kind of logic.

Performing an IOGEN

The following procedure isn't meant to be a cookbook style recipe; in depth MVS systems programming knowhow is required to follow it. Although the TK4- system is set up such that this procedure should work reliably, the author cannot guarantee this. For good reasons IOGENs and SYSGENs always were amongst the most hated tasks on IBM's vintage operating systems.

- Create a backup copy of the system (one never knows…).
- Deactivate RAKF:
    - Submit jobs `RAKF.SAMPLIB(VSAMSRAC)` and `RAKF.SAMPLIB(VTOCSRAC)` to clear the RACF indicators. Note: It is advisable to submit `VTOCSRAC` using `TYPRUN=HOLD` and logoff the TSO session before releasing the job. `VTOCSRAC` will have some issues with long dataset names under the `TK4-` HLQ. These can safely be ignored.
    - Change `SYS1.PARMLIB(RAKFINIT)` from `YES` to `NO`.
    - Re-IPL the system.
    The system is now "disarmed", i.e. while RAKF is still installed, it is no longer active and will grant each and every request. For more information see the RAKF User's Guide, which can be unzipped in PDF or MS-Word format from `RAKF.SAMPLIB($DOC$ZIP)`.
- Edit job `SYS1.SYSGEN.CNTL(IOGEN)` to reflect the desired changes and submit it. Check for errors and rerun as needed!
- Run job `SYS1.UMODCNTL(REST-ALL)` and then all jobs from `SYS1.UMOD.RESTORE.CNTL`.

- Shut down the system.
- IPL the starter system (if you don't have it, get it from the original TK3 CD).
- Submit job `SYS1.STAGE1.IOGEN.OUTPUT` from `MVSRES`. Check output for errors, there generally shouldn't be any condition codes higher than 4.
- Shutdown the starter system and perform an IPL CLPA of the TK4- system. Of course you now experience a vanilla system, particularly in terms of TSO session capabilities… so, be warned and don't worry!
- Run job `SYS1.SYSGEN.CNTL(IO-JCLIN)` to bring SMP back into synch.
- Run job `SYS1.UMODCNTL(APPL-ALL)` to get all usermods back into the system. Carefully read and follow the warning message issued to the console upon submission of the job: You must ensure, that all apply jobs are run sequentially. If they don't, you're guaranteed to completely mess up your system.
- Shut down the system and perform an IPL CLPA.
- Reactivate RAKF:
  - Set the `setracf` parameter in jobs `RAKF.SAMPLIB(VSAMSRAC)` and `RAKF.SAMPLIB(VTOCSRAC)` to `ON` and submit them to switch the RACF indicators back on. Note: It is advisable to submit `VTOCSRAC` using `TYPRUN=HOLD` and logoff the TSO session before releasing the job. `VTOCSRAC` will have some issues with long dataset names under the `TK4-` HLQ. These can safely be ignored.
  - Change `SYS1.PARMLIB(RAKFINIT)` from `NO` to `YES`.
  - Re-IPL the system.

  The system is now "armed", i.e. RAKF will enforce all profiles defined in `SYS1.SECURE.CNTL`. For more information see the RAKF User's Guide, which can be unzipped in PDF or MS-Word format from `RAKF.SAMPLIB($DOC$ZIP)`.
- Enjoy your new I/O configuration.

TCAM Generation

Job `SYS1.SYSGEN.CNTL(TCAMGEN)` is used to generate TCAM as it is provided with the TK4-system. See the comment header of this job for details.

To enable full screen applications, alternate screen sizes and SNA LU2 3270 terminals to work with TCAM a set of usermods has been installed. Look at `SYS1.UMODCNTL` members with names starting with `TC01` and at members `ZJW0005` and `ZJW0008` for details. They are in parts based on an original idea of Margaret Gardner (probably from the late '70s). Her original versions of these usermods together with a comprehensive documentation can be found in PDS `CBT249.FILE069` which is cataloged on the optional CBT volumes.

Alternative Methods to Access TSO

There are many different methods to access the MVS 3.8j TK4- system, interactively through TSO terminal sessions controlled by either VTAM or TCAM, or by submitting batch jobs using local card readers or RJE (Remote Job Entry) terminals. This chapter discusses interactive TSO terminal sessions only.

All TSO sessions involve either a tn3270 or a standard telnet session to be connected to a certain port of the system on which the Hercules instance is running. Some telnet or tn3270 session types are dropped automatically at the end of a TSO session, some not. For stability reasons it is suggested to disable the "auto reconnect" feature of your telnet or telnet 3270

application if it has that feature. Also, any tn3270 sessions should be configured with extended data stream enabled.

TCAM Specific Aspects for 3270 Terminals

The behavior of TCAM controlled 3270 terminals is very close to that of the more commonly used VTAM controlled terminals. Thus TCAM terminals provide a very viable independent second way to access the system if VTAM and/or TSO/VTAM do not work.

The following paragraphs describe the main differences between TCAM and VTAM sessions on 3270 terminals.

Terminal Experience

The terminal experience under TCAM depends on the way applications make use of the various TPUT options (NOEDIT, FULLSCR, ASIS): There is no equivalent on TCAM's "side" of SVC 93 to Greg Price's famous ZP60009 usermod for TSO/VTAM and consequently each TPUT NOEDIT is processed basically as if TPUT FULLSCR had been issued. Consequently, the use of TPUT NOEDIT under TCAM can result in distorted 3270 datastreams.

On the other hand many of today's tn3270 clients do quite well in making sense of this type of datastream distortion, which yields a very usable terminal experience with most applications currently available for MVS 3.8j (namely RFE/REVIEW, RPF, IMON/370, Queue).

Testing has been done using Tom Brennan's Vista TN3270 and IBM's PCOMM 3270 client on Windows systems and x3270 on Linux systems, all of them providing a very smooth terminal experience.

Screen Size

TCAM doesn't query a terminal's capabilities but rather relies on the values specified during TCAM generation (applications may of course query the terminal nonetheless and most do so in fact). So, while TCAM is perfectly able to support any 3270 screen sizes, it in fact supports the size that has been generated for a given terminal only.

In TK4- all TCAM controlled non SNA 3270 terminals are generated as model 4, while all TCAM controlled SNA 3270 terminals are generated as model 3. So, remember to always set your tn3270 application to a mod. 3 (for SNA terminals) or 4 (for non SNA terminals) screen before connecting to a TCAM controlled terminal.

Besides generating TCAM using different screen sizes, there is a way to change the screen sizes on the fly on a per terminal base using the `LETTERS` (`LTR`) TSO command. This requires that you've logged on using the desired 3270 model and are willing to accept quite a few "invalid buffer address" errors from your tn3270 application until you've entered the `LTR` command. See `HELP LETTERS` for details on that command.

Note that due to currently not fully analyzed implementation limits TCAM controlled SNA 3270 terminals larger than a model 3 might exhibit erratic behavior (in rare cases screen distortion, in extremely rare cases TCAM abends). For that reason it is not recommended to use larger screens than model 3 on those terminals.

Toggling Full Screen and Line Mode

All 3270 sessions controlled by TCAM must be toggled manually between line mode and full screen mode using the `PF24` key (shift F12 on most tn3270 applications). Line mode

commands (like listcat, vtoc, listalc, …) don't work well in full screen mode and full screen applications (like RFE, RPF, IM, Q, …) don't work well in line mode. It is advisable to keep track of the mode the session currently is in and press PF24 instead of ENTER if the next command requires the opposite mode.

TCAM terminals retain their full screen or line mode state across TSO sessions. That means if someone logs off from a TSO session while being in full screen mode the next user logging on to that same terminal will start in full screen mode instead of line mode. If you're not sure in which mode you are, simply press ENTER a few times from the TSO READY prompt: In line mode the READY prompt and the cursor will move down with every ENTER, while in full screen mode READY will always be displayed in line 1 and the cursor will always be positioned in line 2 of the screen.

Session Types

Terminal		Telnet		Channel Addresses	Access Method	Emulated Connection	Pre Logon Actions	Post Logoff Actions
Type	Model	Port/Group	Maximum Connections per port					
3270	any	3270	8	0C0-0C7	VTAM	connected to channel attached 3x74	press RESET followed by CLEAR	none
3270	4	3270/TCAM	8	3C0-3C7	TCAM	connected to channel attached 3x74	press RESET followed by CLEAR	press RESET followed by CLEAR
3270	any	37911-37912	1	668-669	VTAM	SNA LU2, connected to channel attached 3791L	press RESET followed by CLEAR	none
3270	3	37055-37056	1	664-665	TCAM	SNA LU2, leased line connected to local 3705 NCP	press RESET followed by CLEAR	press RESET followed by CLEAR
3767	any	37051-37054	1	660-663	VTAM	SNA LU2, dialup line to remote 3705 NCP, leased line to local 3705 NCP	none	enter #release to disconnect
3767					VTAM	SNA LU1, dialup line to remote 3705 NCP, leased line to local 3705 NCP	none	enter #release to disconnect
3767		37913-37914	1	66A-66B	VTAM	SNA LU1, connected to channel attached 3791L	enter #clear and press RETURN	none
3767		37057-37058	1	666-667	TCAM	SNA LU1, leased line connected to local 3705 NCP	press RETURN	none
2741	C	27411-27414	1	688-68B	TCAM	dialup async line to channel attached 2703 TCU	press RETURN	none
2741	P	27415-27418	1	68C-68F	TCAM	dialup async line to channel attached 2703 TCU	press RETURN	none
3335		33351-33354	1	680-683	TCAM	dialup async line to channel attached 2703 TCU	press RETURN	none
3780		37801-37804	1	670-673	JES2	dialup bisync line to channel attached 2703 TCU	none	none

Generalized TSO Logon

A TSO logon always comprises the following steps:

1. Connect a tn3270 or telnet session to a port of Host system providing the session type desired.

2. If the terminal is not already in the state described below, perform session type and access method specific actions according column "Pre Logon Actions" in table "Session Types" on page 24. This brings the terminal into a state which allows a TSO LOGON command to be entered. Upon completion of these actions

   - all TCAM controlled terminals except 2741s will display message

     ```
     IKJ54012A ENTER LOGON –
     ```

   - all TCAM controlled 2741 terminals will display message

     ```
     IKJ53020A ENTER  LOGON
     ```

     followed by the string
     ```
     OW+43929P USVUN  YQAQS
     ```
     when the terminal uses papertape code or preceded by
     ```
     Y.M73z2zG :RU:S  VI,IR
     ```
     when it uses correspondence code.

   - VTAM controlled terminals will display either the logon panel depicted in step 1 on page 8 or the message

     ```
     Enter logon command for application TSO
     ```

     This message is either

     a) followed by the prompt

        ```
        Enter command>
        ```

        if the terminal is a line mode terminal (3767),

     --- or ---

     b) preceded by an empty input field and followed by Volker's cat if it is a 3270 terminal.

3. Once the terminal is in the state described under step 2 a TSO logon command can be entered. Usually the following suffices:

   ```
   logon <user>
   ```

   where `<user>` is the TSO user to be logged on. After entering the command press ENTER on a 3270 terminal or RETURN on a line mode (3767, 3335, 2741) terminal.

   The following special cases should be noted:

   - On a TCAM controlled **3270** terminal, message `IKJ54012A` must be **overwritten** by the logon command. Any remaining data must be removed,

such that the 3270 screen contains the logon command only, then press ENTER. Upon pressing ENTER these terminals will receive an "invalid buffer address" error from the tn3270 emulation if the alternate screen isn't already active. Ignore this error and perform whatever action your tn3270 program requires to continue (usually just accepting the error message); the correct screen setting will be established just before the ENTER CURRENT PASSWORD prompt gets displayed.

- On VTAM controlled terminals the command verb logon can generally be omitted, i.e. it usually suffices to just enter the TSO user name.

See help logon once you are logged on for the full syntax of the TSO logon command.

4. The system will now display message

    ENTER CURRENT PASSWORD FOR <user>-

5. Once the correct password has been entered the logon process will
    - on line mode terminals: Display some useful informational messages followed by the TSO READY prompt.
    - on 3270 terminals: Continue as described in step 3 on page 9.
      Note: On TCAM 3270 terminals it is recommended to press PF24 instead of ENTER after the "Welcome to the TSO" banner, if the terminal is not in full screen mode already. This will switch the terminal to TCAM full screen mode.

Generalized TSO Logoff

To logoff a TSO session perform the following steps:

1. Exit any active application, until the TSO READY prompt is displayed.
2. Enter logoff and press ENTER (3270) or RETURN (line mode).
3. Perform the session type and access method specific steps according column "Post Logoff Actions" in table "Session Types" on page 24.

RJE (Remote Job Entry)

The TK4- system has 4 bisynchronous lines defined for the connection of 3780 RJE (Remote Job Entry) stations. Connect an IBM 3780 emulation to one of the ports 37801 to 37804. These ports correspond to JES2 lines LINE1 to LINE4, each of which is defined as an RJE station with a reader, a printer and a card punch as follows:

```
0000 21.56.51          $DU,LINE1
0004 21.56.51          $HASP000 LINE1    670 ACTIVE   (RMT1) E=N
0004 21.56.51          $HASP000 R1.RD1   670 INACTIVE C=A Q=A P=R1       U=R1        S=ANY H=N
0004 21.56.51          $HASP000 R1.PR1   670 INACTIVE F=0001,AUTOM P=N R=R1       C=6   ,STD
0004 21.56.51          $HASP000                       T=QN  ,STD S=Y LIM=0-* Q=XA
0004 21.56.51          $HASP000 R1.PU1   670 INACTIVE F=0001,OPER P=N R=R1        S=Y LIM=0-* Q=B
```

Known Issues

There currently exist a few known issues which are summarized in the following table:

Issue	Circumvention	Environment	Probable Cause/Remarks
5 seconds timer in IMON/370 monitor G mode R doesn't work. Display doesn't get refreshed in R mode until ENTER is pressed. After pressing ENTER all missing displays are presented in quick succession, then the display stalls again.	Use monitor G in F (manual refresh) mode only.	Local non SNA 3270 under TCAM SNA LU2 under TCAM	Unknown
Terminal name (luname) not displayed in IMON/370 and Q	None, cosmetic issue only	Local non SNA 3270 under TCAM SNA LU2 under TCAM	The terminal name is available in TSB field TSBTRMID, as the PROCSTEP of the TSO session and in the JCTJTPTN field of the initiator task's JCT. Probably IMON and Q don't look up any of these fields.
RETURN needs to be pressed twice to execute commands in TSO line mode. After command execution the TSO READY prompt gets displayed twice.	None, cosmetic issue only	2741 terminals attached through the 2703 ibm1 attachment as emulated by commadpt.c	Probably Circle C/D protocol violation.
RFE doesn't startup in color mode.	Issuing REVIEW's "color" subcommand while browsing a dataset switches color mode on	Local non SNA 3270 under TCAM SNA LU2 under TCAM	No initial QUERY REPLY issued against these terminals.
JRP console task abend 0C4 when CLOSE command is issued from JRP console.	Use "P JRP" command from MVS console to stop JRP.	JRP Console	Logic errors in JRP command processing. These issues already exist in the current JRP distribution for MVS 3.8j in CBT file 755. They are most probably "work in progress" artefacts.
JRP ignores ICLOSE and SHUTDOWN commands when issued from the JRP console.			
Modify interface (F JRP,cmd) doesn't recognize any JRP commands except ICLOSE and SHUT.		MVS Console	
"K D,PFK" command distorts MVS console display, rendering console unusable.	Don't issue "K D,PFK" command. Vary the console offline and back online (using a different console) if a "K D,PFK" was issued nonetheless.	3277-2 display consoles with more than 12 PFKeys assigned.	Screen layout for 3277-2 display consoles isn't designed to support more than 12 PFKeys because a real 3277-2 had 12 PFKeys only.

Appendix A: About the MVS 3.8j Tur(n)key 4- System

About the Hardware

The MVS 3.8j Tur(n)key 4- System runs on an IBM 3033 mainframe emulated by the Hercules System/370, ESA/390, and z/Architecture emulator which is

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Hercules is licensed and distributed under the terms of the Q Public License Version 1.0. See http://www.hercules-390.eu/herclic.html for license details. According to the terms of the license an unmodified copy of the license is available as file `tk4-/hercules/httproot/herclic.html` and all patches applied to Hercules to adapt it to the needs of TK4- have been placed in folder `tk4-/hercules/patches` of the MVS 3.8j Tur(n)key 4- distribution.

About the Operating System

For the present implementation IBM's OS/VS2 (MVS) operating system (Program-Number 5752-VS2, Release 3.8j, Service Level approx. 8505) was chosen, which is in the public domain.

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