THOROUGHBRED®
SOFTWARE INTERNATIONAL, INC.

THOROUGHBRED WEB TERMINAL™

Reference Manual

Version 8.9.1

Thoroughbred Software International, Inc.

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INTRODUCTION

TSWebTerm is Thoroughbred's new web terminal emulation product designed specifically to support and enhance Thoroughbred applications for a character interface. TSWebTerm replaces Thoroughbred's previous web terminal emulation product T-Connect.

TSWebTerm is designed specifically for Thoroughbred development environments, providing not only the standard features of an emulator but also functionality specific to Thoroughbred products.

- Support for 24 function keys
- Copy and Paste across applications
- Scrolling
- Slave Printing
- Dictionary-IV color settings
- Mouse aware capabilities for your 3GL applications
- Mouse aware capabilities for your character-based Dictionary-IV and OPENworkshop applications

Emulation uses the standard Thoroughbred terminal table definition: TSWEBTRM. The TSWEBTRM terminal table has been designed specifically for Thoroughbred Web Terminal, please use this table to ensure proper emulation.

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INSTALLATION AND SETUP

Prerequisites

Before installing TSWebTerm, the following packages must be installed on your system:

- libwebsockets-dev
- libuv-dev (or libuv1-dev)
- libjson-c-dev (or json-c-dev)
- zlib-dev
- sshpass

To install the prerequisites and TSWebTerm you must be logged in as root. Commands that require root privileges will begin with the root prompt (#).

To install on rpm-based systems (i.e. Red Hat, AlmaLinux, Rocky Linux):

dnf install epel-release
dnf install libwebsockets-devel libuv-devel json-c-devel zlib-devel sshpass

To install on Debian-based systems (i.e. Debian, Ubuntu):

apt-get install -y libwebsockets-dev libuv1-dev libjson-c-dev zlib-dev sshpass

To install on SUSE-based systems (i.e. SUSE Linux, openSUSE):

install libwebsockets-devel libjson-c-devel libuv-devel openssl-devel libopenssl-3-devel sshpass

After a package is successfully installed, the output from the command will display “Complete!”.

Installing and Activating TSWebTerm

To install TSWebTerm, first unpack the master file:

cd /opt/tbred
mkdir tswebterm
Copy the downloaded product file into /opt/tbred/tswebterm
cd tswebterm
umask 0
cpio -ivBumd < TSWT
./install

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The /usr/lib/basic, /usr/lib/basic/tmp and /var/log/tbred directories are required for activating and running TSWebTerm. The *setup.sh* script will create these directories if they do not exist. The /usr/lib/basic/tmp directory is required for generating PDFs. The *setup.sh* script will also install the tswebterm terminfo definition and setup log rotation for the TSWebTerm log files.

```
# cd tswebterm/bin
# ./setup.sh
```

To manually create the /usr/lib/basic, /usr/lib/basic/tmp and /var/log/tbred directories:

```
# mkdir /usr/lib/basic
# chmod 777 basic
# mkdir /usr/lib/basic/tmp
# chmod 777 /usr/lib/basic/tmp
# mkdir /var/log/tbred
```

After the /usr/lib/basic, /usr/lib/basic/tmp and /var/log/tbred directories have been created, either manually or via the *setup.sh* script, TSWebTerm must be installed and activated:

```
# cd /opt/tbred/tswebterm
# ./install
#./tswtact
```

Terminfo

TSWebTerm sets the UNIX/Linux TERM variable to ‘tswebterm’. This requires a terminfo entry. The tswebterm terminfo file is included with the TSWebTerm install and is located in the terminfo/t directory.

To manually install the TSWebTerm terminal definition:

```
# cp /opt/tbred/tswebterm/terminfo/t/tswebterm /usr/share/terminfo/t/tswebterm
```

Log Rotation

To manually setup log rotation for the TSWebTerm log files:

```
# cp /opt/tbred/tswebterm/bin/tswebterm.logrotate /etc/logrotate.d/tswebterm
```


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Update the Firewall

Once installed, the TSWebTerm port and a range of ephemeral (i.e. redirect) ports must be opened in your firewall. The default TSWebTerm port number is 5622. The default range of ephemeral (i.e. redirect) ports used by TSWebTerm is 56220 to 60315. If a different port number or port range is to be used when connecting to TSWebTerm, use the desired port numbers when updating the firewall.

If not using a firewall appliance, the TSWebTerm port number and port range must be added to the system's firewall.

To open the default port and port range via firewall-cmd, do the following:

```
# firewall-cmd –permanent --add-port=5622/tcp
# firewall-cmd –permanent --add-port=56220-60315/tcp
# firewall-cmd --reload
```

To open the default port and port range via ufw, do the following:

```
# ufw allow 5622/tcp
# ufw allow 56220:60315/tcp
```

When defining the redirect port range, the number of ports must be greater than the user count.

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Starting TSWebTerm

TSWebTerm can be started via the command line or as a service.

Usage:

tswebterm [options]

Options:

-p, --port	Port to listen (default: 5622)
-H, --ssh-host	ssh server host
-P, --ssh-port	ssh server port (default: 22)
-R, --rd-port-start	Redirect child port range start (default: 56220)
-E, --rd-port-end	Redirect child port range end (default: 60315)
-c, --child-timeout	Child process connection timeout (seconds) (default: 10)
-C, --ssl-cert	SSL certificate file path
-K, --ssl-key	SSL key file path
-A, --ssl-ca	SSL CA file path for client certificate verification
-s, --signal	Signal to send to the command when exit it (default: 1, SIGHUP)
-T, --terminal-type	Terminal type to report, default: tswebterm
-k, --ping-interval	Websocket ping interval (minutes) (default: 5)
-6, --ipv6	Enable IPv6 support
-d, --debug	Set tswebterm log level (default: 7)
-D, --ws-debug	Set Websocket log level (default: 0)
-h, --help	Print this text and exit

To start TSWebTerm via the command line, run the *start* script as root:

```
# cd /opt/tbred/tswebterm
# ./start
```


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The *start* script:

```
# startup script - Thoroughbred Web Terminal
#

# wtport=5622

# Use the following on Ubuntu:
# UV_USE_IO_URING=0
# export UV_USE_IO_URING

wt_exe=/opt/tbred/tswebterm/tswebterm
# wt_param1=--port=$wtport
# wt_param2=--ssh-host=<system-name>
# wt_param3=--ssh-port=<port-number>
# wt_param4="--rd-port-start=<starting port number> --rd-port-end=<ending port number>"
# wt_param5="--ssl-key=<key file name> --ssl-cert=<cert file name> --ssl-ca=<ca file name>"

wt_cmd="$wt_exe $wt_param1 $wt_param2 $wt_param3 $wt_param4 $wt_param5"

$wt_cmd
```

To check that TSWebTerm is started and listening, run the following:

```
$ ps –ef | grep -w tswebterm
$ netstat –na | grep 5622
```

When running TSWebTerm on Ubuntu, it is recommended to disable the libuv library's use of the io_uring kernel subsystem for asynchronous I/O to prevent issues such as high CPU usage.

By default, when the TSWebTerm server is started by the *start* script, it will allow HTTP connections on port 5622. To connect on a different port number, uncomment and change wtport to the desired port number and then uncomment wt_param2 to start TSWebTerm on the desired port:

```
wtport=2265

wt_parm2=--port=$wtport
```

The default ssh port number is 22. To run with a different ssh port number, uncomment and change wt_param3 to the desired port number to start TSWebTerm with the desired ssh-port:

```
wt_parm3=--ssh-port=22022
```

The default range of redirect ports used by TSWebTerm is 56220 to 60315. If a different range of ports is required, uncomment and change wt_param4 to start TSWebTerm with the desired port range:

```
wt_param4="--rd-port-start=56220 --rd-port-end=57243"
```


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To enable HTTPS connections, TSWebTerm must me started with the –ssl-key and –ssl-cert options. The –ssl-ca option is optional. Uncomment and change wt_param6 with the SSL information to start the TSWebTerm to allow HTTPS connections:

wt_parm5="—ssl-key=./key.pem –ssl-cert=./cert.pem"

The specified private key file must be unencrypted (i.e. no password/passphrase). If the specified private key file is encrypted, TSWebTerm will not start.

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Installing the TSWebTerm Service

The *tswebterm.systemd* service file:

```
# systemd unit file - Thoroughbred Web Terminal
#

[Unit]
Description=Thoroughbred Web Terminal
After=network.target

[Service]
Type=simple
UMask=000
# Use the following on Ubuntu:
# Environment=UV_USE_IO_URING=0
WorkingDirectory=/opt/tbred/tswebterm
ExecStart=/opt/tbred/tswebterm/tswebterm --ssh-host %H
# ExecStart=/opt/tbred/tswebterm/tswebterm --ssh-host %H --rd-port-start 56220 \
                                           --rd-port-end 60315
# ExecStart=/opt/tbred/tswebterm/tswebterm --ssh-host %H --ssl-cert <cert file name> \
                                           --ssl-key <key file name> --ssl-ca <ca file name>

[Install]
WantedBy=multi-user.target
```

To install the TSWebTerm service, the *loadservice.sh* script will copy the *tsweberm.systemd* file from the bin directory to the appropriate system directories or the service file can be loaded manually.

To install the TSWebTerm service via the script, run the following:

```
# cd /opt/tbred/tswebterm/bin
# ./loadservice.sh
```

By default, when the TSWebTerm server is started as a service, it will allow HTTP connections on port 5622. Similar to the *start* script, the service file can be modified to use a different port when connecting to TSWebTerm, to use a different port for ssh connections, to use a different redirect port range and to enable HTTPS connections.

If the TSWebTerm service needs to be modified, it is recommended that changes are made to the *tswebterm.systemd* file and then reloaded with the *loadservice.sh* script.

systemd

To manually install the TSWebTerm service:

```
# cp /opt/tbred/tswebterm/bin/tswebterm.systemd /etc/systemd/system/tswebterm.service
# systemctl daemon-reload
```


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To start the TSWebTerm service:

```
# systemctl start tswebterm
```

To have the TSWebTerm service start automatically when the system boots:

```
# systemctl enable tswebterm
```

To stop the TSWebTerm service:

```
# systemctl stop tswebterm
```

To prevent the TSWebTerm service from starting automatically when the system boots:

```
# systemctl disable tswebterm
```

SELinux Configuration

If the TSWebTerm service does not start, check to see if SELinux is enabled and enforcing on the system.

```
# sestatus
```

To label the tswebterm program, do the following:

```
# semanage fcontext -a -t unconfined_exec_t /opt/tbred/tswebterm/tswebterm
# restorecon -v /opt/tbred/tswebterm/tswebterm
```

After relabeling the tswebterm program, restart the TSWebTerm service:

```
# systemctl start tswebterm
```

The wtservice.sh script

To perform all of the above service commands, run the *tcservice.sh* script located in the tswebterm/bin directory. This script must be run as root and will start, stop, restart, enable or disable the TSWebTerm service.

To start the TSWebTerm service:

```
# cd /opt/tbred/tswebterm/bin
# ./wtservice.sh start
```

To stop the TSWebTerm service:

```
# cd /opt/tbred/tswebterm/bin
# ./wtservice.sh stop
```


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Stopping TSWebTerm

If TSWebTerm was started using the *start* script, search for the running tswebterm process and then kill the process:

```
# ps -ef | grep -w tswebterm
# kill < tswebterm process id>
```

If TSWebTerm was started as a service, then stop the service by either the *systemctl* command or the *wtservice.sh* script.

When TSWebTerm is stopped, all TSWebTerm connections will be terminated and display the reconnect message. When TSWebTerm starts again, these connections in reconnect mode will automatically restart the connection.

Terminal Table

TSWebTerm uses the TSWEBTRM terminal table, modify your TERM.MAP file accordingly. For more information on TERM.MAP please see the Basic Customization and Tuning Guide System Files manual.

```
tswebterm:TSWEBTRM
```


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TSWebTerm as a Gateway

TSWebterm can function as a secure web-based gateway that allows users to access multiple systems on your network.

When running multiple TSWebTerm processes on a system, it is recommended that each TSWebTerm process is run from a different service file and uses a different range of redirect ports.

For example, to connect to system1.company.com, the system running TSWebTerm,, *tswebterm.systemd*:

```
ExecStart=/opt/tbred/tswebterm/tswebterm --ssh-host %H  --rd-port-start 56220 --rd-port-end 56319
```

To connect to system2.company.com, *tswebterm-5623.systemd*:

```
ExecStart=/opt/tbred/tswebterm/tswebterm --port 5623 --ssh-host system2.company.com \
                                         --rd-port-start 56320 --rd-port-end 56419
```

To connect to system3.company.com, *tswebterm-5624.systemd*:

```
ExecStart=/opt/tbred/tswebterm/tswebterm --port 5624 --ssh-host system2.company.com \
                                         --rd-port-start 56320 --rd-port-end 56519
```

It is recommended that changes are made to each *systemd* service file in the /opt/tbred/tswebterm/bin directory and that the *loadservice.sh* script is updated to copy all *systemd* service files, then reloaded with the *loadservice.sh* script.

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THOROUGHBRED WEB TERMINAL SESSION

Connect to the TSWebTerm Host System

Start a browser of your choice. TSWebTerm has been tested with the following browsers:

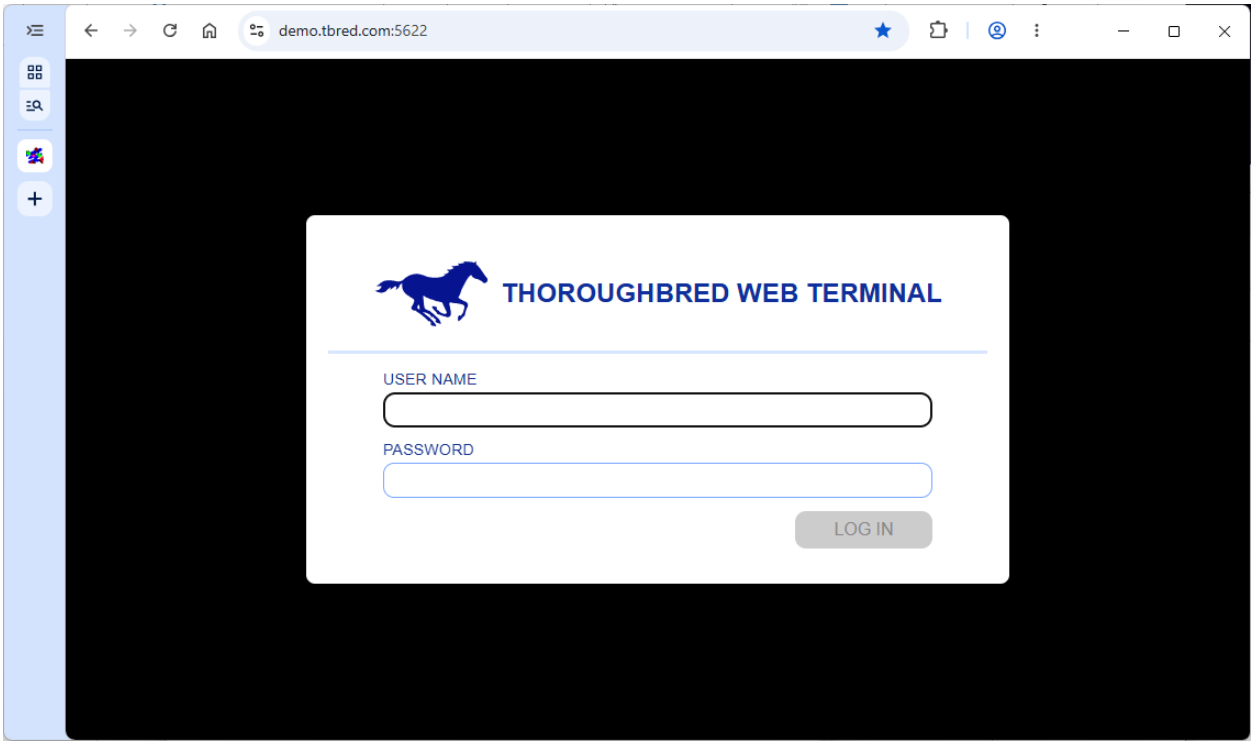
- Brave
- Apple Safari
- Google Chrome
- Microsoft Edge
- Mozilla Firefox
- Opera

To start a web terminal session, enter the following into the address bar of the browser:

http://<system-name>:5622/

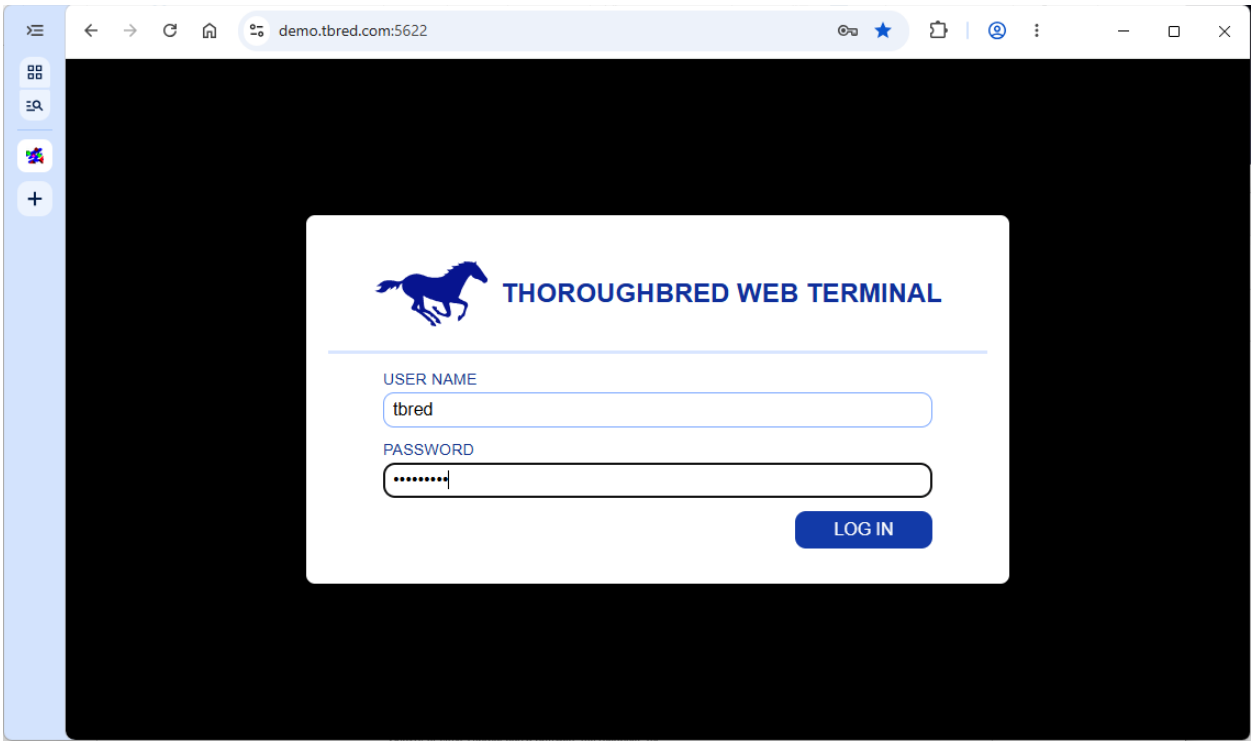
If the TSWebTerm server was started with the SSL options, replace the http with https. If the TSWebTerm server was started with a different port number, replace the 5622 with the alternate port number.

When connected to the system, you will be presented with login dialog:

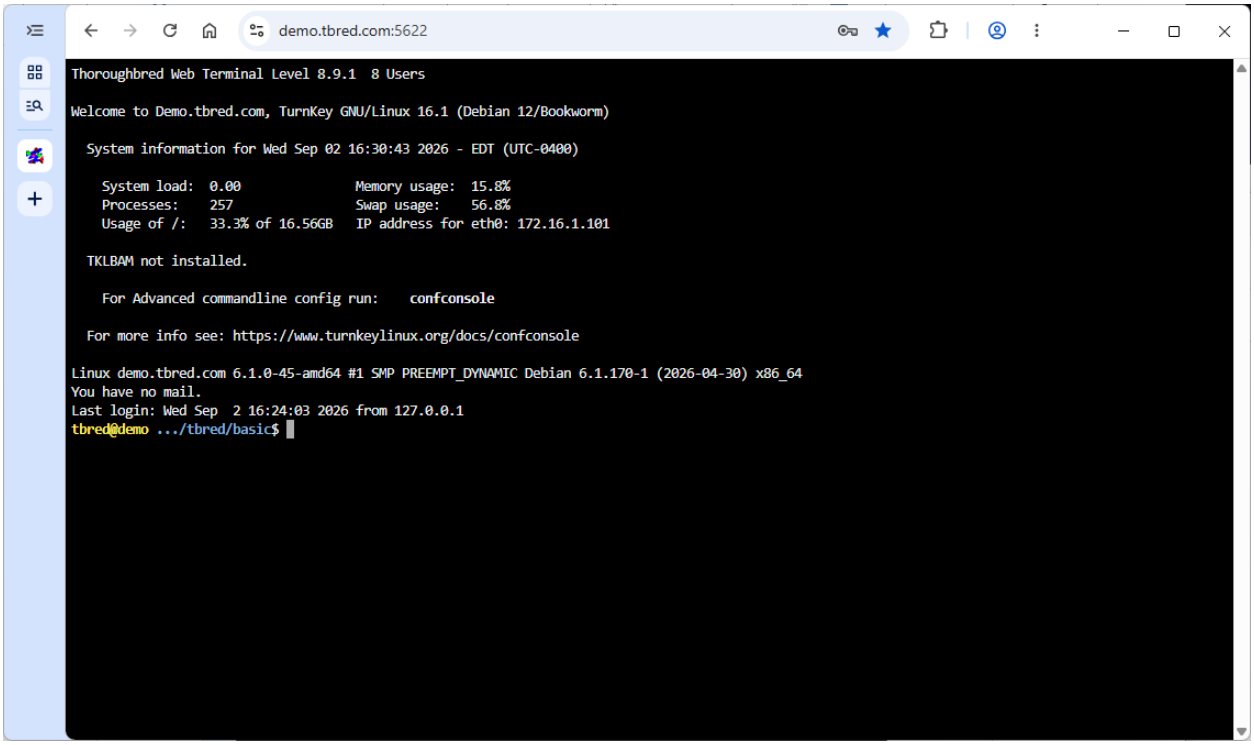


Enter your user name and password:

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Press return or click the LOG IN button to log onto the system:



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URL Parameters

Similar to AutoLogons in TbredComm, you can specify your user name and password when starting a web terminal session. You can also suppress the startup banner, change the font size, the cursor and the window title. This is accomplished by appending one or more URL parameters to your connection URL.

To specify a URL parameter, append a ? and the URL parameter to your connection URL. Multiple parameters can be specified by appending an & and the URL parameter after the first URL parameter:

http://<system-name>:5622/?<url-paramenter-1>[&<url-parameter-2>...]

Current URL Parameters:

- user=<value>
- pass=<value>
- banner=no
- fontSize=<number>

  The default fontSize is 14.

- cursorStyle=block|underline|bar

  The default cursorStyle is block.

- titleFixed=<string>

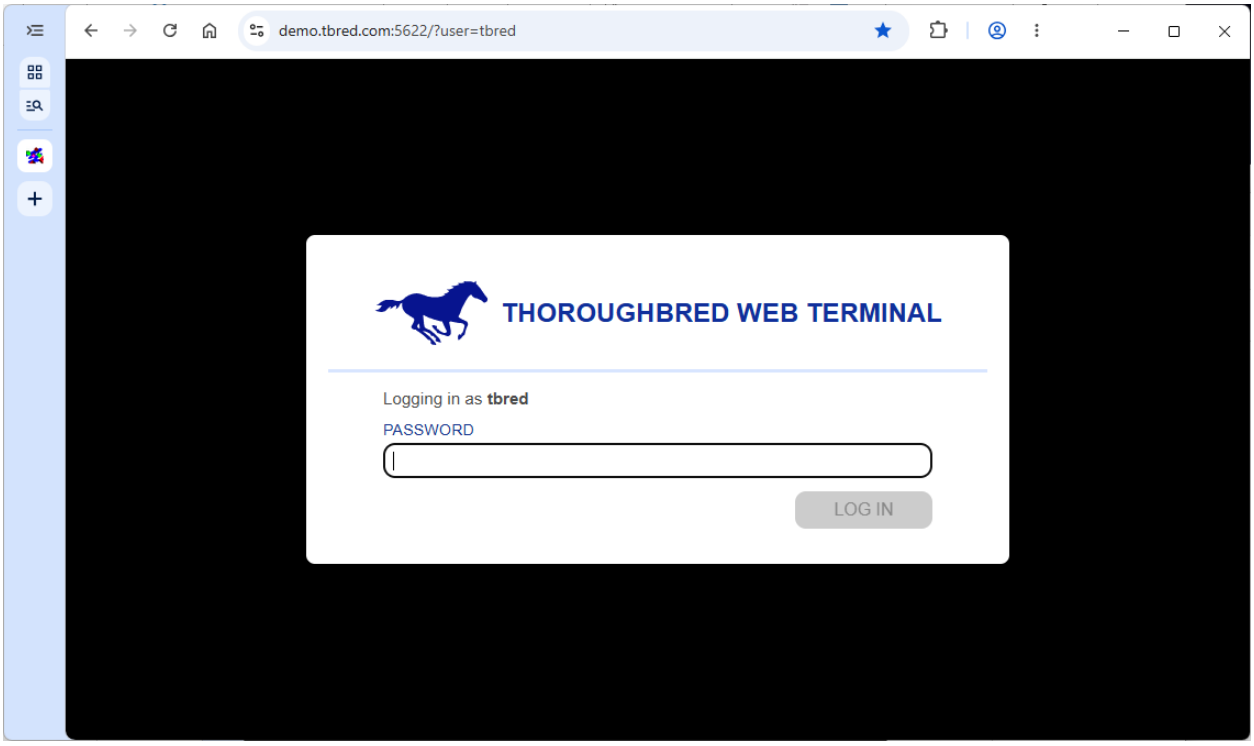
  The new title <string> will be displayed after a connection has been established.

To specify your user name when starting a web terminal session, enter the following into the address bar of the browser and replace <username> with your user id.

http://<system-name>:5622/?user=<username>

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When connected to the system, you will be presented with just a password prompt.



To start a web terminal session without having to enter your user id or password, enter the following into the address bar of the browser, replace <username> with your user id and <password> with your password:

http://<system-name>:5622/?user=<username>&pass=<password>

The security implications of specifying a password in the URL must be considered by the user. It is recommended that this type of connection is only done on a secure network.

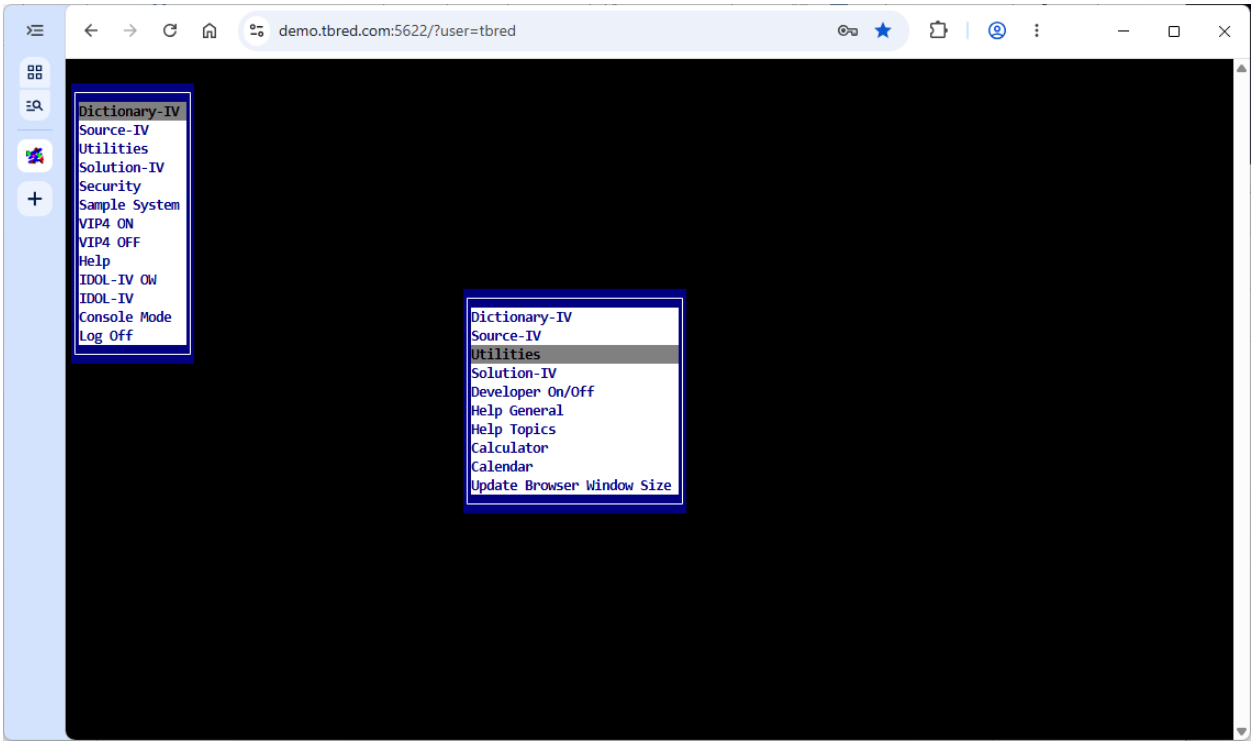
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Using TSWebTerm

Resizing the Terminal Window

When not running the browser as a maximized window, the size of the terminal window will be determined by the browser window size. If the browser window is resized, the terminal window size will also be resized.

The terminal window can also be resized manually in Basic. One method to manually resize the terminal window is to open the **control-p** menu and select **Update Browser Window Size**:



Another method to manually resize the terminal window is to print the Resize Window mnemonic, ‘RW’, in Basic console mode:

basic> PRINT ‘RW’

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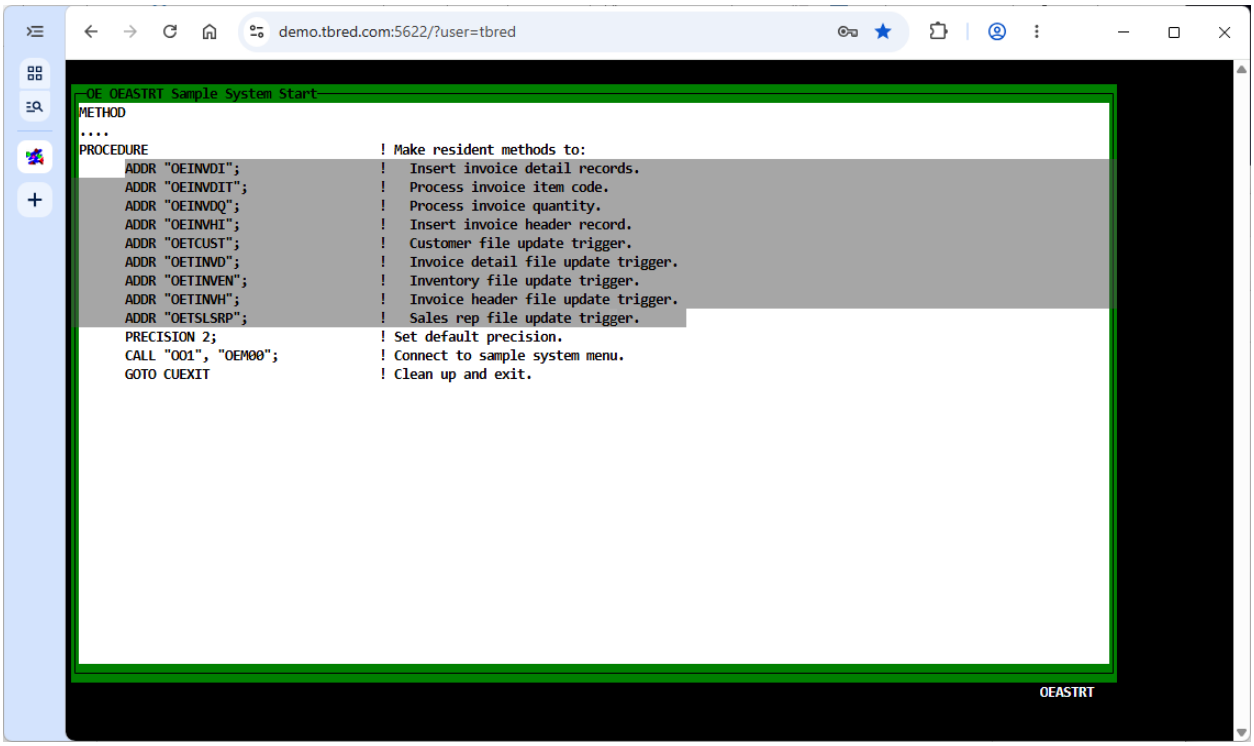
Changing the Font Size

The font size of the terminal window can be changed by using the Zoom feature of the browser. From the browser's menu, click on the + next to Zoom to increase the font size or click on – to decrease the font size.

The font size can also be changed by using keyboard shortcuts to Zoom in or out. To increase the font size, enter **control +**. To decrease the font size, enter **control -**.

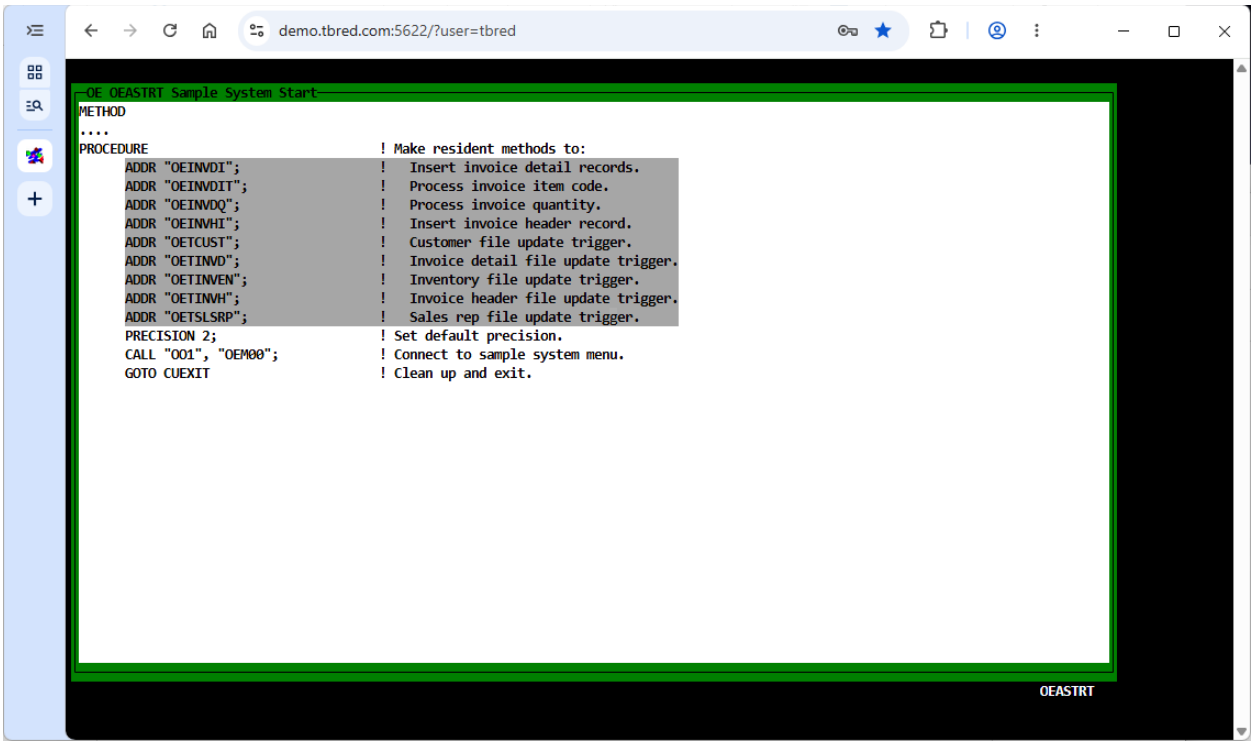
Selecting Text

There are 2 modes for selecting text in TSWebTerm. In the default mode, line mode, click the **left mouse button** and drag the mouse to select text. Selecting multiple lines of text will wrap around the end of each line.



In column mode, click the **alt key** and the **left mouse button** to select a rectangle of text. When in column mode, the cursor will be changed to a cross. Selecting multiple lines will not wrap around the end of each line. This is similar to the Smart Copy option in TbredComm.

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Copy/Paste

Copying and pasting of text can be performed via the keyboard or the mouse.

To copy selected text via the keyboard, enter **control-shift-c** or **control-c**. If no text is selected, **control-c** will send an interrupt.

To paste text via the keyboard, enter **control-shift-v** or **control-v**.

Mouse Aware

TSWebTerm is mouse aware, but this feature is disabled when you first connect to a system. Once you start up a Basic session, mouse aware will be enabled. When you release out of Basic, mouse aware will be disabled.

Mouse aware can also be enabled or disabled manually printing the Mouse Begin or Mouse End mnemonics, ‘MB’ or “ME’, in Basic console mode. To manually enable mouse aware:

basic> PRINT ‘MB’

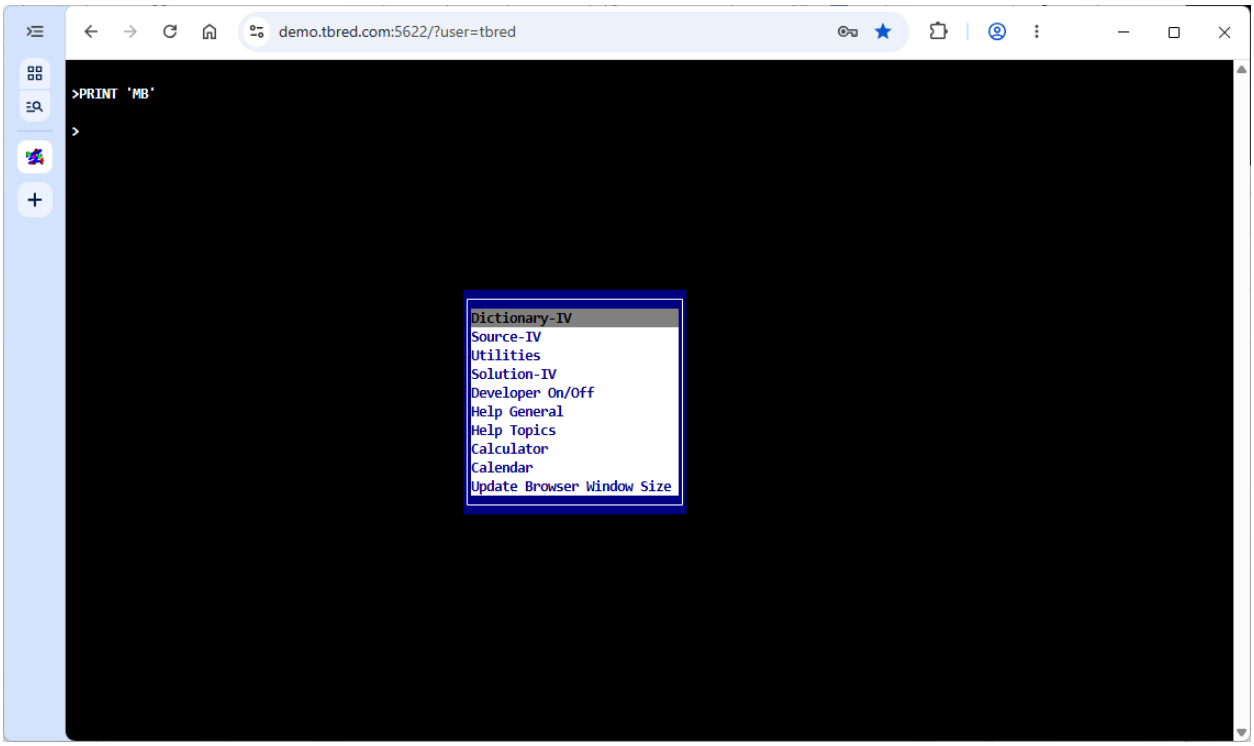
To manually disable mouse aware:

basic> PRINT ‘ME’

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Context Menu/Control-p Menu

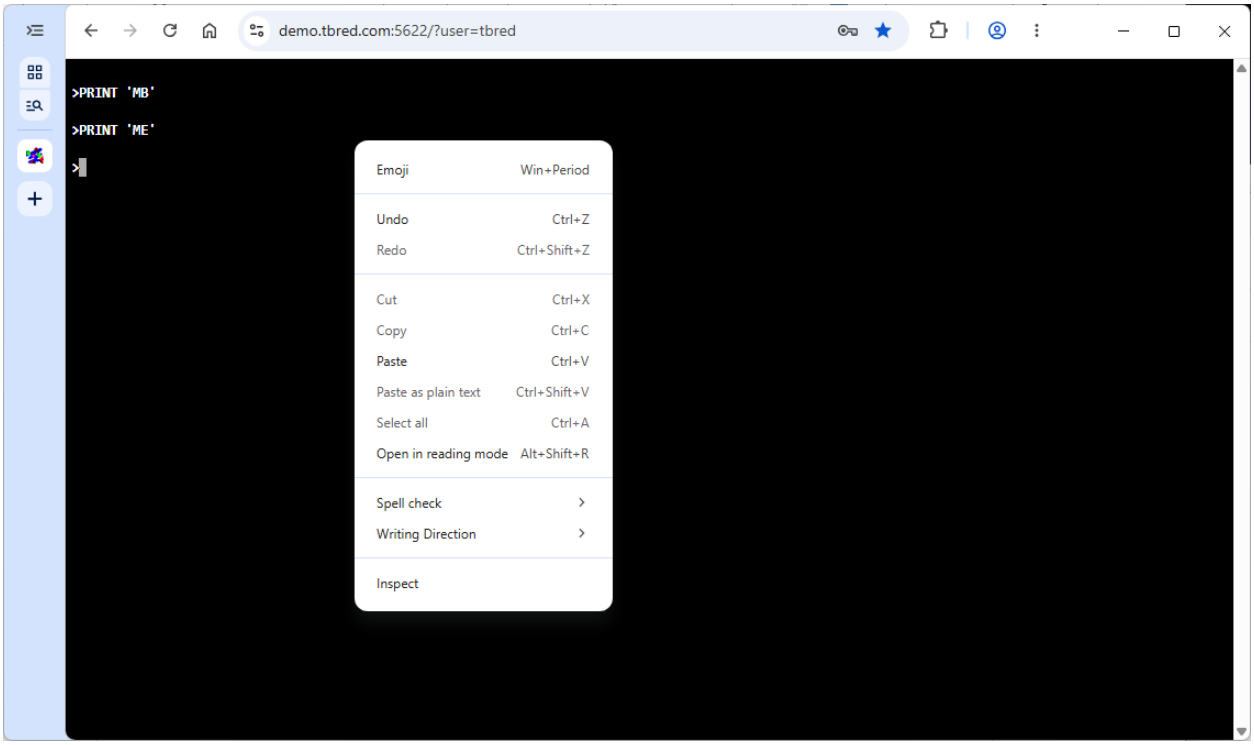
When mouse aware is enabled, a **right-click** will generate a **control-p**, displaying the **control-p** menu:



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When mouse aware is disabled, a **right-click** will display the browser's context menu.

When mouse aware is enabled, a **control right-click** will display the browser's context menu:



Line-Insert and Line-Delete

Similar to other Thoroughbred products, a line insert is generated by entering **shift-insert** and a line delete is generated by entering **shift-delete**. A line insert can also be generated by entering **control-a,** and a line delete by entering **control-d**.

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Printing Overview

TSWebTerm printing will generate a PDF file that is made available through the browser. Depending upon the browser settings, the PDF file will be downloaded and opened in a new tab, downloaded by the browser with an option to save the file, or the user will be prompted for an action. To accomplish this TSWebTerm utilizes both Thoroughbred Report-IV to PDF (with 3GL wrapper) product and the Gateway for Windows product. Both of these products are now bundled with Dictionary-IV.

Before you can print using TSWebTerm, you must first install them. To install and configure Report-IV to PDF with 3GL Wrapper please refer to the Report-IV to PDF manual. To install Gateway for Windows simply include that GWW product when doing the Dictionary-IV installation (merge), please refer to the Dictionary-IV installation manual for details.

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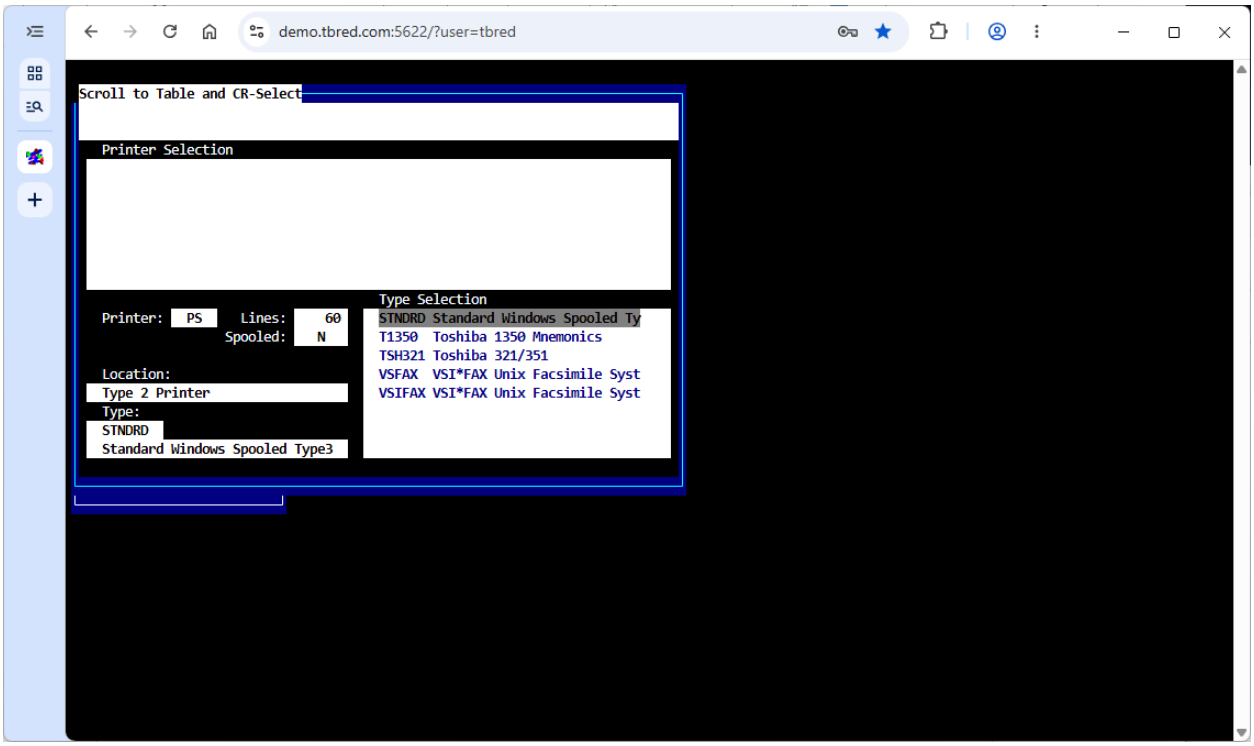
Printing to a Type 2 Printer

A standard slave printer must be defined in the IPLINPUT file.

DEV PS,4,,,,2,,tty

For more information on defining this printer type in the IPL file please refer to the Basic manuals.

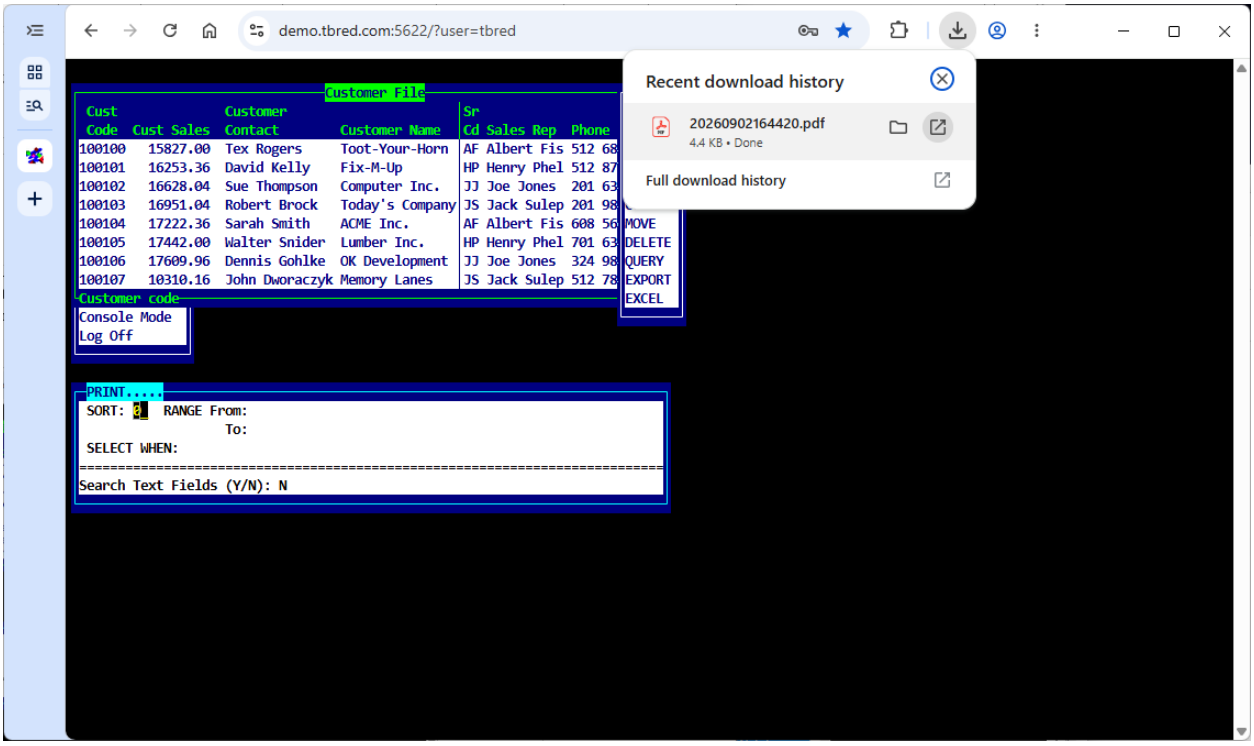
The printer must have a Dictionary-IV printer assignment using the STNDRD printer table distributed with Dictionary-IV. From the Dictionary-IV System Administration menu select **Printer Assignment** and assign the STNDRD printer table to the device defined in the IPLINPUT file:



When a type 2 printer is selected as the output device, TSWebTerm will automatically generate the output in PDF format. Depending upon the browser settings, the PDF file will be downloaded and opened in a new tab, downloaded by the browser with an option to save the file, or the user will be prompted for an action. To change this behavior please refer to your browser settings.

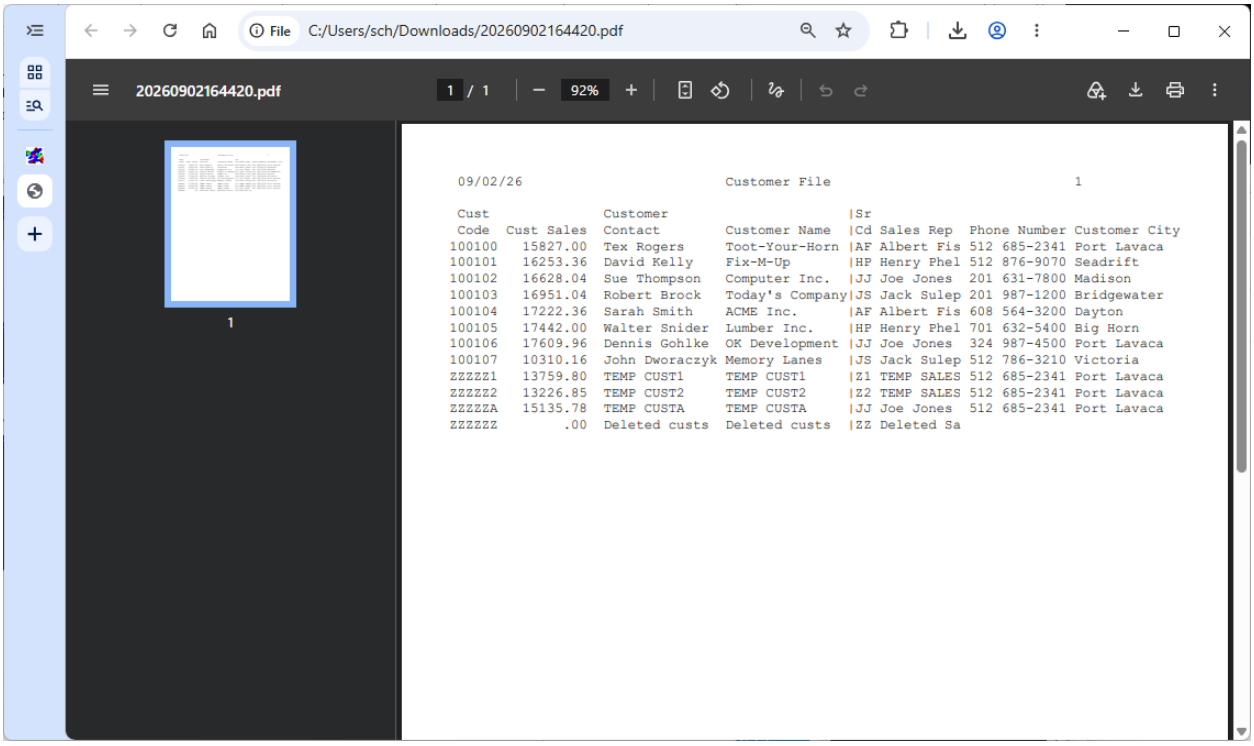
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In the following example the **F8** Print option from an OPENworkshop View was selected and a type 2 printer was chosen for output. The PDF file was generated and downloaded by the browser. The PDF file is saved in the browser download directory. The file name is YYYYMMDDhhmmss.pdf.



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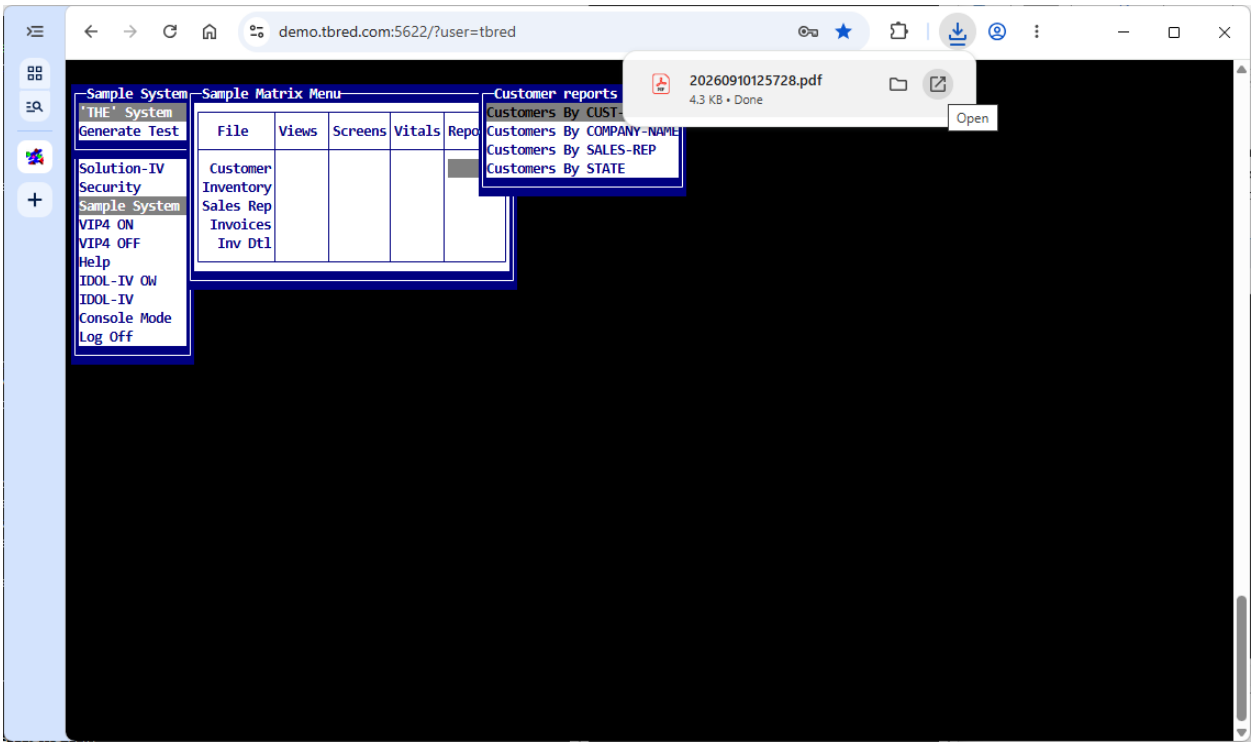
Selecting Open in the Downloads menu of the browser will open the PDF in a new tab:



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Printing to Report-IV to PDF and 3GL Wrapper

Both the Report-IV to PDF and the 3GL wrapper are supported by TSWebTerm. Viewing and saving a PDF file is seamless when using TSWebTerm. It does not require a network share (e.g. Samba) or an http server to download and view the PDF documents. Depending upon the browser settings the PDF file will be downloaded and opened in a new tab, downloaded by the browser with an option to save the file, or the user will be prompted for an action. To change this behavior please refer to your browser settings.



This feature is controlled by a new option in Report-IV to PDF maintained in the logical format #OOFPDF1.TC-AUTO-LOAD. When set to **Y** the PDF file will automatically be processed through the browser. This is the default setting, any other value will disable this feature and the Report-IV to PDF product will behave as it did in previous releases using TbredComm.

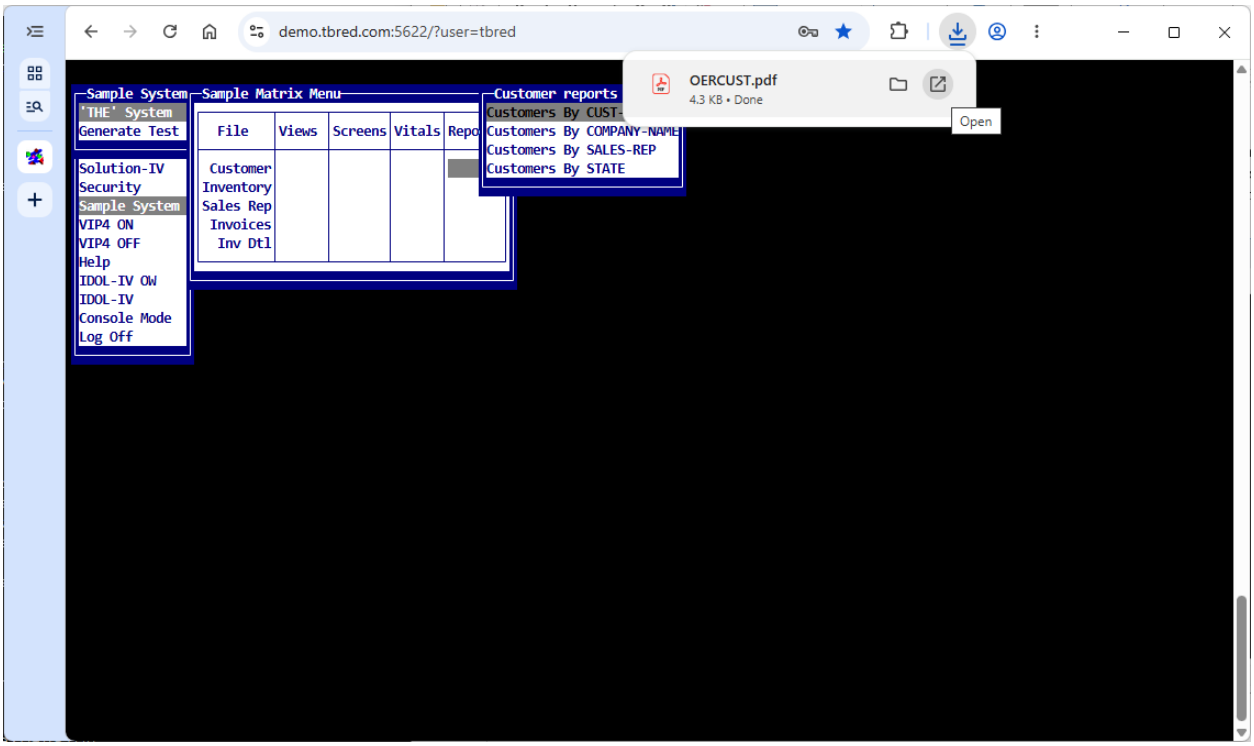
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To change the value, use Dictionary-IV Format Maintenance to edit OOFPDF1 and clear the PreSet value. For the change to take effect the global settings stored in #OOFPDF1 must be reloaded. From the Report-IV to PDF Utilities menu select the option to **Reset Global Settings**. The value can be manipulated dynamically by changing the value of #OOFPDF1.TC-AUTO-LOAD prior to executing a CONNECT Report or in the 3GL program that calls the 3GL wrapper OORPDFX.

For more information, please see the Report-IV to PDF manual.

Printing to TS ReportServer

The TS ReportServer product supports printing in TSWebTerm. It does not open the ReportServer window on the workstation, instead it will generate a PDF file. Depending upon the browser settings, the PDF file will be downloaded and opened in a new tab, downloaded by the browser with an option to save the file, or the user will be prompted for an action. To change this behavior please refer to your browser settings.



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TSWebTerm with Dictionary-IV and OPENworkshop

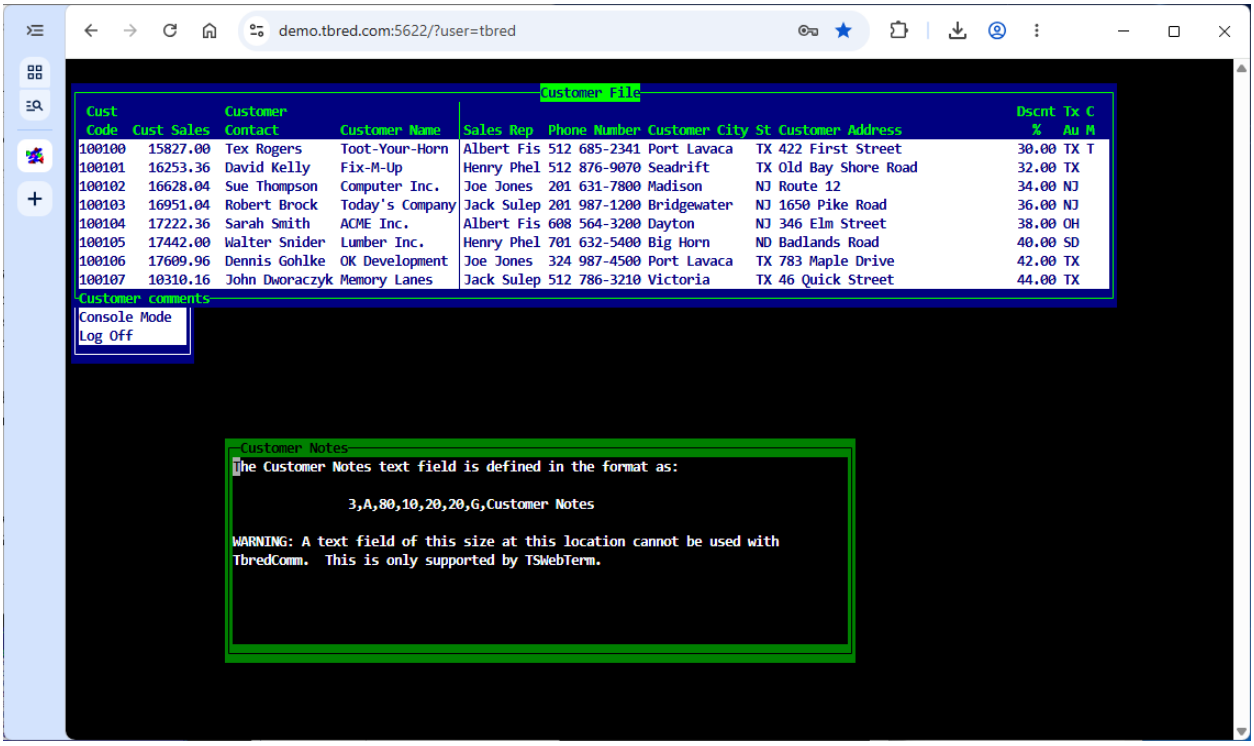
Dictionary-IV Overview

TSWebTerm supports creating large Dictionary-IV objects: Views, Screens, Pop Up Menus, Help, Reports displayed to the screen, Text Fields, and Source-IV source. All editors including EDITF support editing large objects. Objects that have been saved with a size greater than 80x24 can no longer be edited using TbredComm, the contents are not scaled down to fit an 80x24 window and text will be truncated.

When using the mouse to resize the browser window it may be necessary to 'refresh' the contents. The OPENworkshop hot key menu has been updated to include an option **Update Browser Window Size** to refresh with browser.

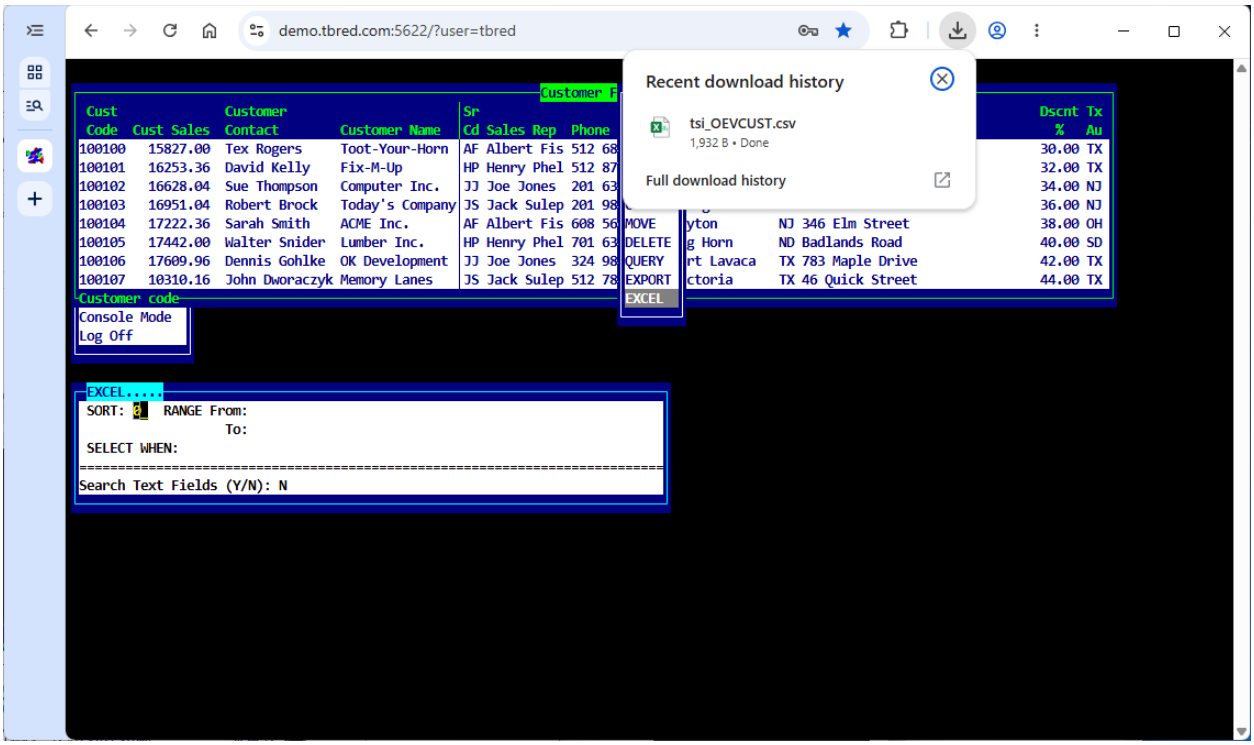
Views

OPENworkshop will detect TSWebTerm and will allow view objects and positions beyond the 80x24 matrix. This example also shows a text field defined for 80 columns by 10 rows at column 20 and row 20.



The View **F8** Excel option will create the .csv file and the browser will download it. The .csv file can be opened with Excel or any application that supports .csv file types. Depending upon the browser settings the .csv file will be downloaded or opened automatically using the application associated with .csv files. To change this behavior please refer to your browser settings.

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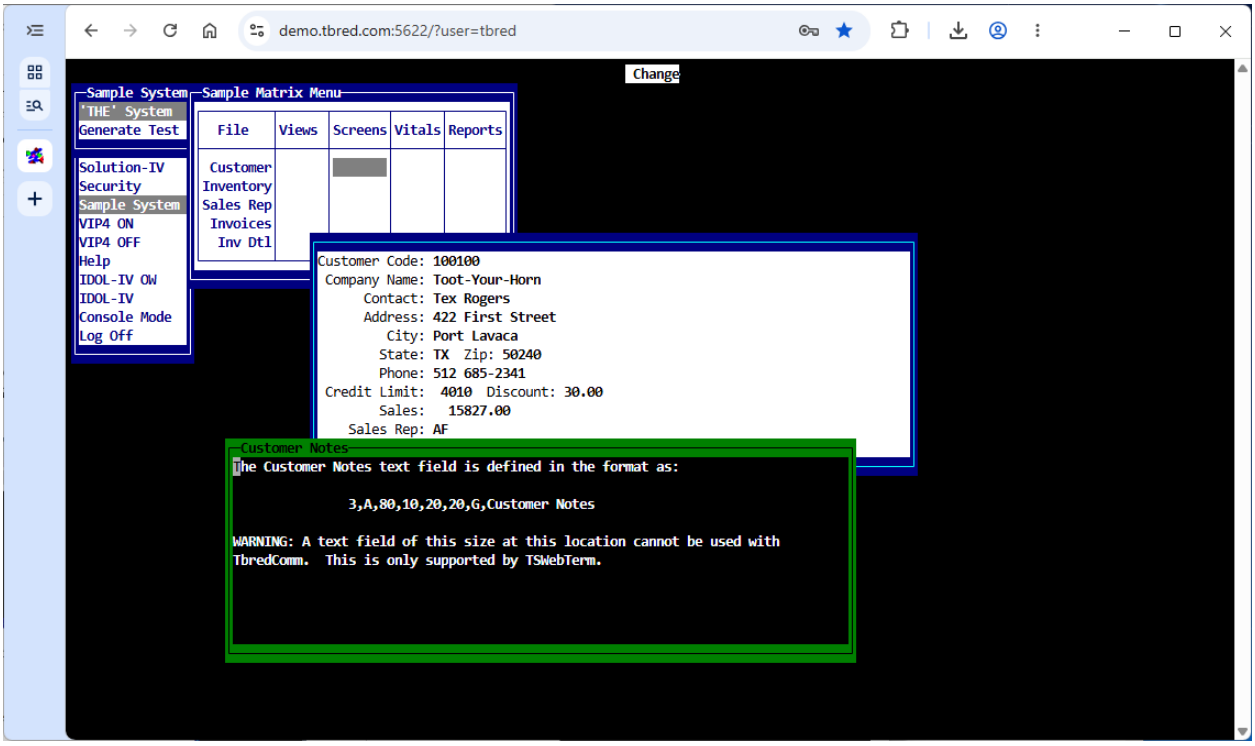


When using the View **F8** Print option, select a **type 2** printer for output and a PDF file will be generated and downloaded by the browser. For more information, please refer to the section on Printing.

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Screens

OPENworkshop will detect TSWebTerm and will allow screen objects and positions beyond the 80x24 matrix. This example also shows a text field defined for 80 columns by 10 rows at column 20 and row 20.



Pop Up Menus and Help

OPENworkshop will detect TSWebTerm and will allow PopUp Menus, Help objects and positions beyond the 80x24 matrix. Help definitions that contain the Help type, window size and location in line 0 can specify a 'Docking' flag. Valid help types are:

.HH. Simple Help
.HI. Index Help.
.HM. PopUp Menu
.MM. PopUp Menu
.HF. Function Key Help

Valid column docking flags are: L - Dock Left or R - Dock Right
Valid row docking flags are: T - Doc Top or B - Dock Bottom

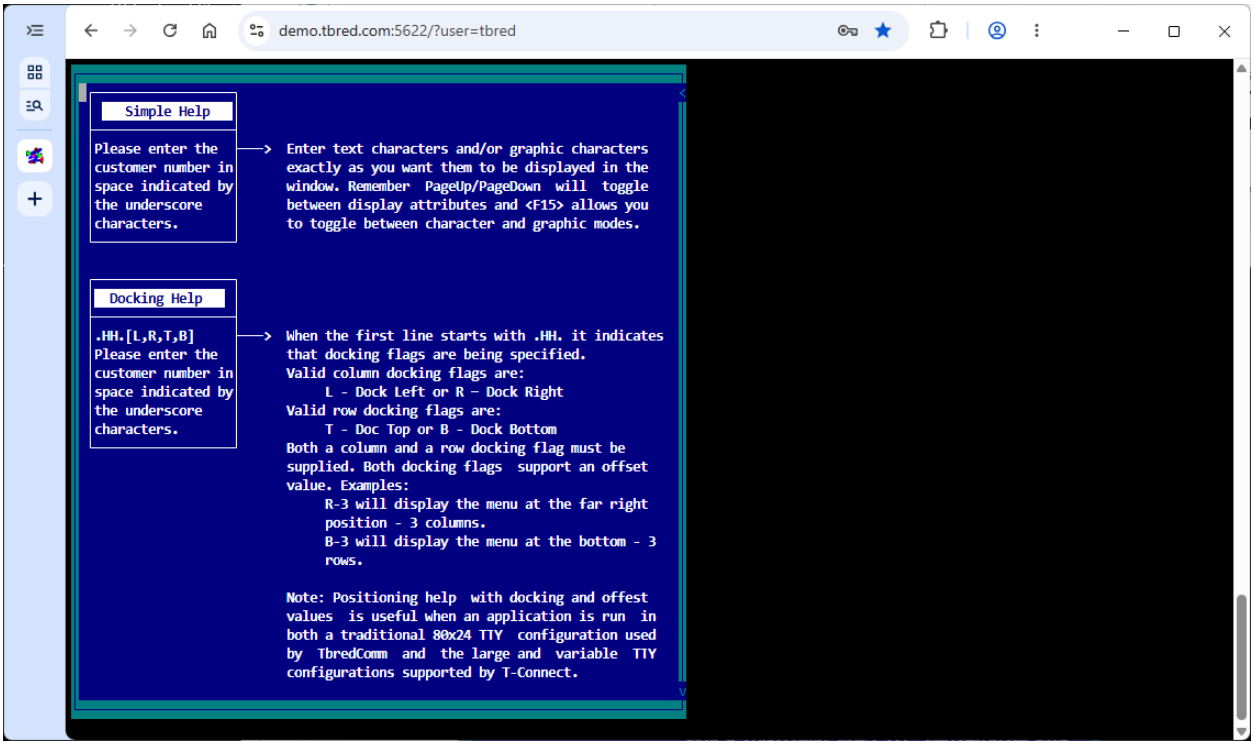
Both a column and a row docking flag must be supplied. Both docking flags support an offset value. Examples:

R-3 will display the menu at the far right position - 3 columns.

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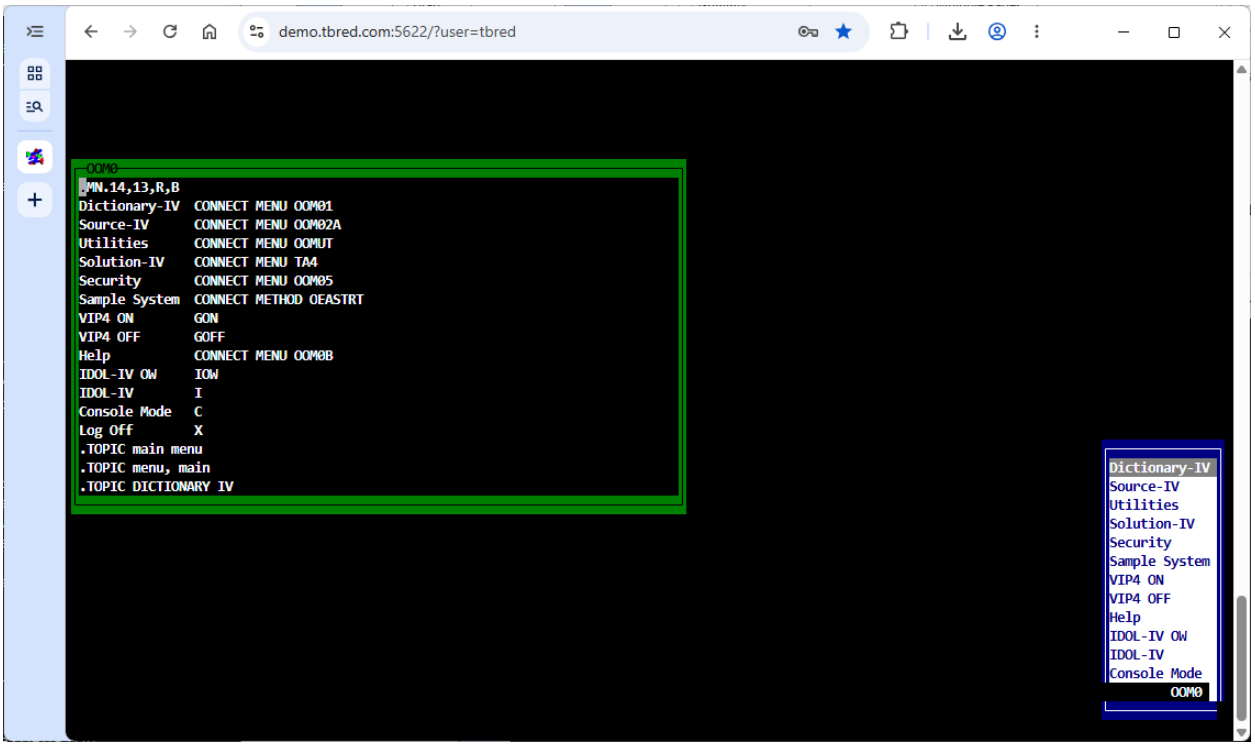
B-3 will display the menu at the bottom - 3 rows.

Positioning help with docking and offset values is useful when an application is run in both a traditional 80x24 configuration used by TbredComm and the large configurations supported by TSWebTerm.



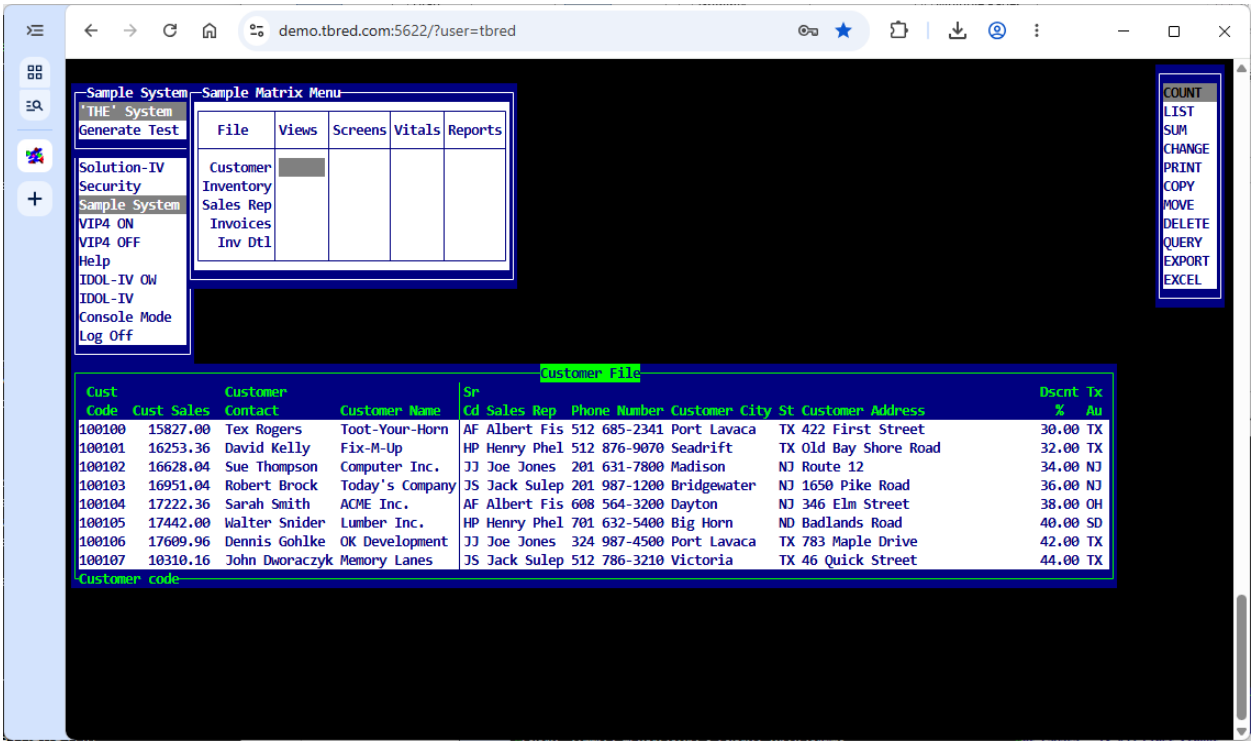
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In menu OOM0 setting the first line to .MN.14,13,R,B will result in the main OPENworkshop menu being docket Right and Bottom.



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In the following example the **F8** View Special Function menu is defined to dock Right and Top:

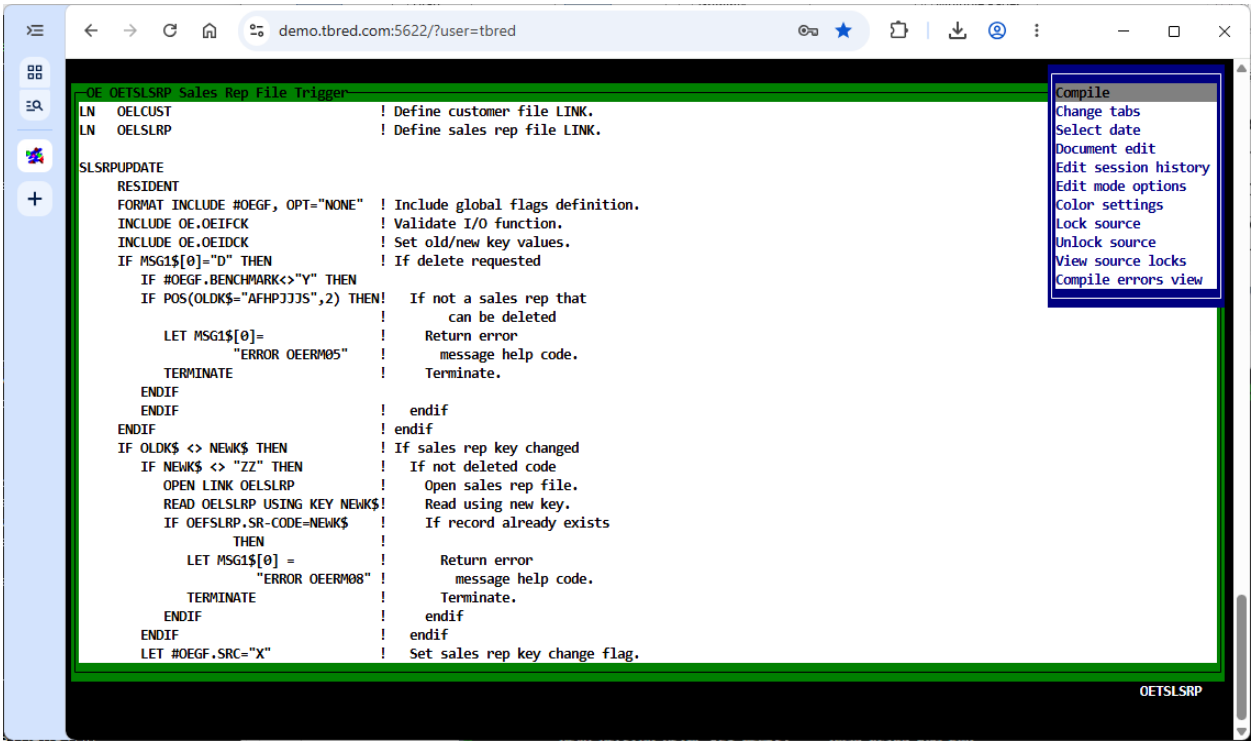


To review the online help, from the main OPENworkshop menu select **Help**, **Language Help**, **API Services**, and then **8HELP**.

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Source-IV and EDITF

Both the Source-IV editor and console editor EDITF will maximize the browser space. In Source-IV, wide text (more than 80 cols) is only supported by TSWebTerm, it is not supported by TbredComm. If displayed in a standard 80 column wide emulator window, text beyond column 78 will be truncated. Once saved this way it cannot be undone. A warning message will be displayed before saving an 80 col wide Source definition to a wider width.



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Downloading Files

TSWebTerm supports downloading files to the workstation through the browser. To accomplish this CALL Method GWWCOMD from the application code.

MSG$[0] = Return status, if no error occurred will be “.”
MSG$[1] = “O” dOwnload function
MSG$[2] = DF message string for the browser
(1,4) “DF**” function code
(5,5) length of message starting in byte 5
(10,1) “B” block mode
(11,3) length of directory name
(14,x) directory name
(14+x, y) length of file name
(14+x+y, z) file name
MSG$[3] = “FILE “ + directory name + file name

In the following example GWWCOMD is CALLed to download a PDF file through the browser:

```
METHOD MSG$[ALL]
....
PROCEDURE
    F1$="/opt/tbred/basic/PDFiles/",        ! directory containing PDF file
    F2$="A00001.pdf";                       ! file name to download
    DIM M$[3];                              ! dim GWWCOMD array
    M$[1]="O",                              ! set function to Open/Download
    M$[2]="DF**"+                           ! set GWWCOMD message type:
    "00000"+                                ! message length place holder
    "B"+                                    ! block mode
    STR(LEN(F1$):"000")+                    ! length of directory name
    F1$+                                    ! directory name
    STR(LEN(F2$):"000")+                    ! length of file name
    F2$,                                    ! file name
    M$[2](5,5)=                             ! set length of message string
    STR(LEN(M$[2](10)):"00000");            ! Starting in byte 5
    M$[3]="FILE "+F1$+F2$;                  ! set file name with full path
    CALL "GWWCOMD",M$[ALL];                 ! call GWWCOMD to download the file
    GOTO CUEXIT                             ! Standard Method exit logic
```


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