ASD's Standard Procedure for IOC Console Access

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A. iocConsole

The term 'IOC' no longer implies 'a VME processor running vxWorks'. An IOC can now also be an EPICS application task running on a workstation or server. The iocConsole program provides a common mechanism for connecting to VME IOC console serial lines as well as these soft IOC virtual terminal sessions.
To connect to an IOC console use the command

```
iocConsole iocname
```

The *iocname* argument must be the actual name of the IOC. Don't prepend a 'c'.

IocConsole Quick Reference

|	Soft IOC (via *screen*)	IOC (via *screen*)	IOC (via *telnet*)
Password	yours	yours term server	term server
Disconnect	C-a d	C-a d	C-] c
Connection	ssh ctlapps1 screen	ssh omicron screen	telnet

As summarized in the above table, the iocConsole program takes one of three possible actions depending upon the type of IOC to which it is connecting:

1. The IOC is a VME 'hard' IOC that is not using a GNU screen session. In this case iocConsole will simply run a telnet session to the IOC console terminal server as shown in figure 1. You will be prompted for the appropriate terminal server password. To terminate the session, type control-] c just as you would to terminate any other telnet session.
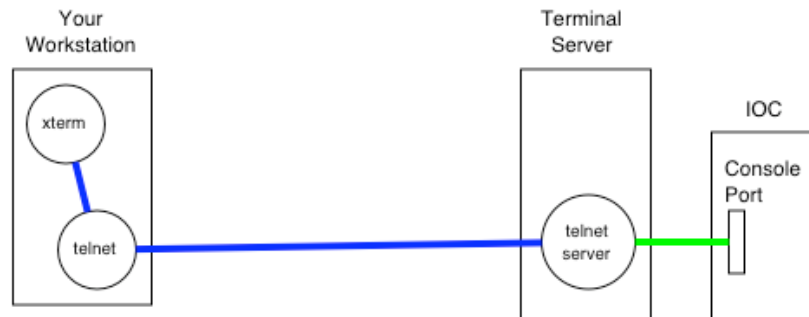

Figure 1. Telnet connection

2. The IOC is a VME 'hard' IOC that is using a GNU screen session (see the following section for the advantages of this mode of operation). In this case iocConsole will ssh to omicron and connect to the screen session communicating with the IOC console. If no screen session exists for this IOC a new screen session will be started. You will be prompted for your login password (unless you have set up your account on omicron to allow ssh connections without requiring a password). If a new screen session must be started you will also be prompted for the appropriate terminal server password. To terminate the session, type control-A d, which will detach your connection from the screen session, but leave the screen session connected to the IOC console. This mode of operation is illustrated by figures 2, 3 and 4 which show one active connection, no active connections, and two active connections, respectively.
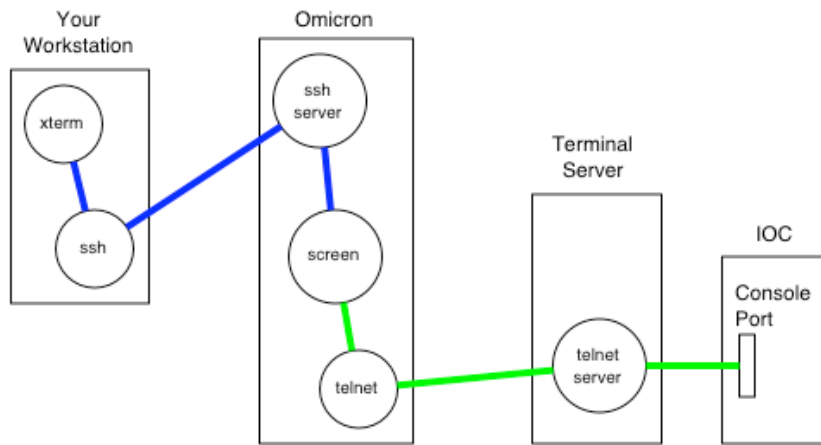
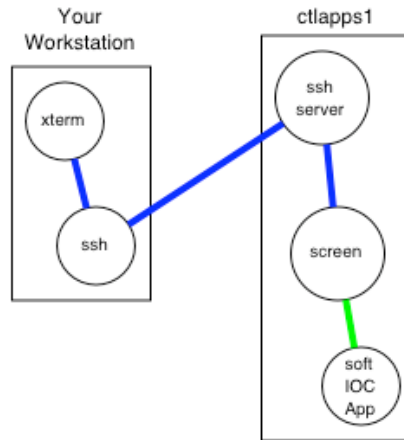**Figure 2. Single active screen connection**
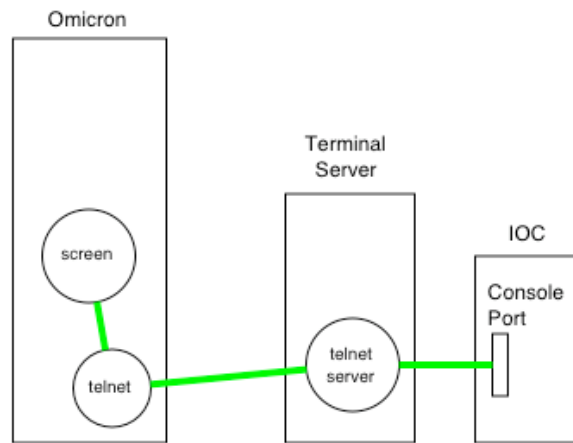
Figure 3. No active screen connections
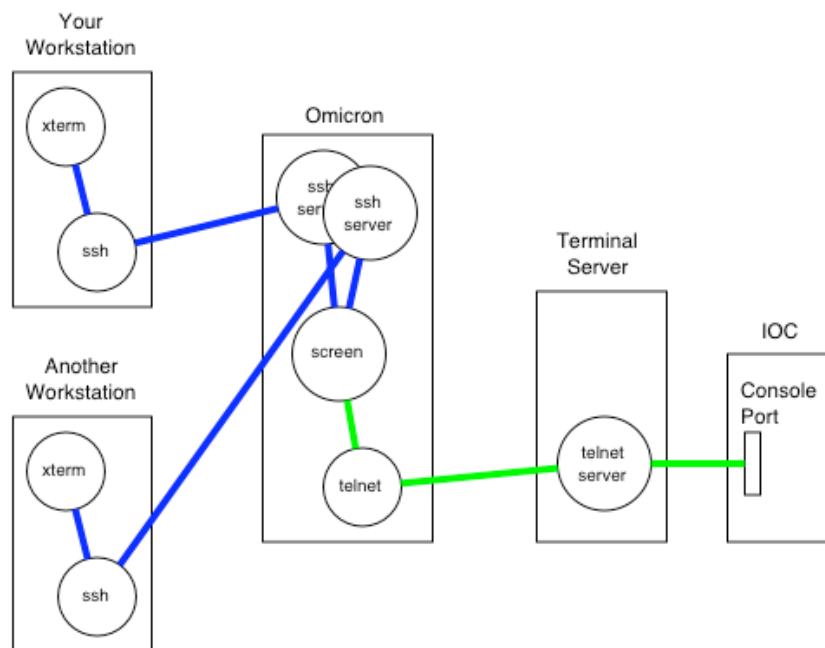
Figure 4. Two active screen connections

3. The IOC is a 'soft' IOC running on a workstation or server. In this case iocConsole will ssh to that machine and connect to the screen session acting as the virtual console for with the soft IOC application. You will be prompted for your login password (unless you have set up your account on that machine to allow ssh connections without requiring a password). To terminate the session, type control-A d, which will detach your connection to the screen session, but leave the screen session connected to the soft IOC virtual console. This mode of operation is illustrated by figure 5. Multiple connections to the screen session are allowed as is operation with no connections to the screen session.

Figure 5. One active screen connection, soft IOC

B. The GNU screen program

The GNU screen program was originally written to act as a multiple-session window manager for a single physical terminal. Although multiplexing multiple sessions on a single physical terminal is no longer necessary now that multi-window GUI workspaces are available the screen program provides some features which make it a very useful method to manage to IOC console sessions.

> The telnet session to the IOC console continues to run even when no users are attached to the screen session. This is very useful in that IOC console output is captured and can be viewed when the next iocConsole session attaches.
> It maintains a scrollback history buffer so IOC console output can be retreived even if it has scrolled off the top of your terminal window. It is also possible to search the scrollback buffer making it easy to find that diagnostic message that scrolled by earlier.
> It allows multiple simultaneous connections. Anything typed in one session appears in all of them. More than one operations or support personnel at at time can be viewing the IOC console output.

Everything typed to the screen session sent to the program running in the current window. The only exception to this is the one keystroke that is used to initiate a command to the screen session manager itself. By default each command begins with a control- (abbreviated C-a from now on), and is followed by one other keystroke. The command character and all the key bindings can be fully customized to be anything desired, though they are always two characters in length.

The most import screen commands are :

C-a d   Detach the screen session from this terminal (C-a C-d also works).
C-a ?   Show all screen commands.
C-a [Enter copy/scrollback mode (C-a C-[or C-a <esc> also work).
> In copy/scrollback mode you can use 'vi' or 'emacs' commands to move around the scrollback history.
> Some useful scrollback mode commands are:
>> Arrow keys move line by line or column by column.
>> h, j, k, l move line by line or column by column (vi-style).
>> + - move one line up/down.
>> C-u C-d move up/down one half a screen.
>> C-b C-f move up/down a full screen.
>> g moves to the beginning of the scrollback history.
>> % preceded by a number jumps to that percentage of the scrollback.
>> / or ? followed by some characters followed by a return searches forward or backwards for those characters.

<esc> exits copy/scrollback mode.

C-a *   Show a list of all users attatched to this screen session.

C. Examples

The following examples illustrate the three methods which iocConsole uses to connect to an IOC console.

VME IOC using telnet

```
norume@photon 201> iocConsole iocsrvid1
telnet ciocsrvid1
Trying 164.54.18.37...
Connected to ciocsrvid1.aps.anl.gov.
Escape character is '^]'.

#                   ← storage ring IOC terminal server password typed here
iocsrvid1>
iocsrvid1>
iocsrvid1>
iocsrvid1>    ←C-] typed here
telnet> c
Connection closed.
```

VME IOC using screen

```
norume@photon 202> iocConsole iocs1fb
Password: #                    ← my (norume) password typed here

                    NOTICE TO USERS
This is a Federal computer system and is the property of the United
.
.
.
to these terms and conditions of use.   LOG OFF IMMEDIATELY if you do
not agree to the conditions stated in this warning.

    ^A d    detach    ←Reminder of most important screen commands
    ^A ?    help
.
.       <<<<<<<  Full screen of previous IOC console output appears  here    >>>>>>>
.
CA_event    _event_task    595ecc 181 PEND    25ea6   595e80      0     0
CA_event    _event_task    6727d4 181 PE      25ea6   672788      0     0
CA_online   _rsrv_online   9011ac 182 D       2a89e   90111c      0   600
CA_UDP      _cast_server   948464 183 PE      25ea6   94828c      0     0
EV_save_res_event_task     6ba8f4 189 PEN     25ea6   6ba8a8   3006b     0
save_restor_save_restor    6bd1bc 190 PEND+T  25ea6   6bd0f0   3d0004    1
logRestart eb0eca          b4f7a8 200 PEND+T  25ea6   b4f760     39   623
taskwd     e9ad24          b4e5f0 200 DELAY   2a89e   b4e534      0    83
cpuUsageTascf5302          b261ec 255 READY   2a89e   b2617c      0     0
value = 0 = 0x0
iocs1fb>
iocs1fb>         ←C-a d typed here
[detached]
Connection to omicron closed.
```

Soft IOC using screen

```
norume@photon 203> iocConsole siocnetmon
norume@ctlapps1's password: #                    ← my (norume) password typed here
.
.           <<<<<<<<<  Full screen of previous IOC console output appears here     >>>>>>>>>
.
siocnetmon:load
siocnetmon:caHostId1
siocnetmon:caHostId2
siocnetmon:caHostId3
siocnetmon:caHostId4
siocnetmon:caHostId5
siocnetmon>
siocnetmon>
siocnetmon>         ←C-a d typed here
[detached]
Connection to ctlapps1 closed.
```