

Appendix

```
dos.library/CliInitNewcli                                dos.library/CliInitNewcli

NAME
    CliInitNewcli -- Set up a process to be a shell from initial packet

SYNOPSIS
    flags = CliInitNewcli( packet )
    D0                                A0

    LONG CliInitNewcli( struct DosPacket * )

FUNCTION
    This function initializes a process and CLI structure for a new
    shell, from parameters in an initial packet passed by the system
    (NewShell or NewCLI, etc). The format of the data in the packet
    is purposely not defined. The setup includes all the normal fields
    in the structures that are required for proper operation (current
    directory, paths, input streams, etc).

    It returns a set of flags containing information about what type
    of shell invocation this is.

    Definitions for the values of fn:
        Bit 31    Set to indicate flags are valid
        Bit 3     Set to indicate asynch system call
        Bit 2     Set if this is a System() call
        Bit 1     Set if user provided input stream
        Bit 0     Set if RUN provided output stream

    If Bit 31 is 0, then you must check IoErr() to determine if an error
    occurred. If IoErr() returns a pointer to your process, there has
    been an error, and you should clean up and exit. The packet will
    have already been returned by CliInitNewcli(). If it isn't a pointer
    to your process and Bit 31 is 0, reply the packet immediately.
    (Note: this is different from what you do for CliInitRun().)

    This function is very similar to CliInitRun().

INPUTS
    packet - the initial packet sent to your process MsgPort

RESULT
    fn - flags or a pointer

SEE ALSO
    CliInitRun(), ReplyPkt(), WaitPkt(), IoErr()
```

```
dos.library/CliInitRun                                    dos.library/CliInitRun

NAME
    CliInitRun -- Set up a process to be a shell from initial packet

SYNOPSIS
    flags = CliInitRun( packet )
    D0                                A0

    LONG CliInitRun( struct DosPacket * )

FUNCTION
    This function initializes a process and CLI structure for a new
    shell, from parameters in an initial packet passed by the system
    (Run, System(), Execute()). The format of the data in the packet
    is purposely not defined. The setup includes all the normal fields
    in the structures that are required for proper operation (current
    directory, paths, input streams, etc).

    It returns a set of flags containing information about what type
    of shell invocation this is.

    Definitions for the values of fn:
        Bit 31    Set to indicate flags are valid
        Bit 3     Set to indicate asynch system call
        Bit 2     Set if this is a System() call
        Bit 1     Set if user provided input stream
        Bit 0     Set if RUN provided output stream

    If Bit 31 is 0, then you must check IoErr() to determine if an error
    occurred. If IoErr() returns a pointer to your process, there has
    been an error, and you should clean up and exit. The packet will
    have already been returned by CliInitNewcli(). If it isn't a pointer
    to your process and Bit 31 is 0, you should wait before replying
    the packet until after you've loaded the first command (or when you
    exit). This helps avoid disk "gronking" with the Run command.
    (Note: this is different from what you do for CliInitNewcli().)

    If Bit 31 is 1, then if Bit 3 is one, ReplyPkt() the packet
    immediately (Asynch System()), otherwise wait until your shell exits
    (Sync System(), Execute()).
    (Note: this is different from what you do for CliInitNewcli().)

    This function is very similar to CliInitNewcli().

INPUTS
    packet - the initial packet sent to your process MsgPort

RESULT
    fn - flags or a pointer

SEE ALSO
    CliInitNewcli(), ReplyPkt(), WaitPkt(), System(), Execute(), IoErr()
```

AmigaDOS

Page II - 73

```

/* myshell.c - Execute me to compile me with lattice 5.10b
LC -b0 -cfirst -v -d0 -j73 myshell.c
Blink FROM myshell.o TO myshell.lib:amiga.lib lib:debug.lib smallcode smalldata
quit

Where:
-bi means Locate data as a 16 bit offset from A4.
-cfirst means Compatibility options:
        f - Forces compiler
            if a function has no prototype.
        i - Ignores extra #includes of
            an already #included file.
        s - Tells LC to generate a single copy
            of all identical string constants
            into a program's code section.
        t - Tells LC to warn you if it encounters
            a structure or union tag that has
            not been defined.
-v means Disable the stack checking LC normally
-d0 means puts at the beginning of each function.
-y means Do not put any debugging info into the object file.
        Load the base address of the data section
        into A4. This is used in conjunction
        with -b1.
-j73 means Ignore warning #73. This basically makes LC
        ignore the script comment delimiter (the
        semicolon) at the front of this file.
*/

/* The following command lines will compile myshell.c using pragmas
LC -b0 -cfirst -v -r1 -rr -d0 -j73 -dOPRAGMAS myshell.c
Blink FROM myshell.o TO myshell.smallcode.smalldata

Where:
-rl means Make all subroutines "near". The compiler will
        use a 16-bit PC relative address to locate
        the subroutine.
-rr means Use registerized parameters for subroutines (no
        amiga.lib stubs!).

The rest of the parameters were described above.
*/

/* This is a basically a skeleton of a UserShell. A UserShell is a special
   shell that can replace the default system shell. It has to meets some
   system requirements to function as a system shell. This example takes care
   of all of those requirements. To make this shell the system shell, use the
   resident command:
   * resident shell MyShell SYSTEM
   *
   * Because this shell only serves as an minimal example of a UserShell and does
   * not do many of the standard functions a shell normally performs. It is
   * limited to the commands from the resident list (which would make it a bad
   * idea to add this shell to the resident list if you need a useable default
   * shell!)
   */

#include <exec/types.h>
#include <exec/memory.h>
#include <dos/dosextens.h>
#include <dos/stdio.h>
#include <clib/exec_protos.h>
#include <clib/dos_protos.h>
#include <clib/atlib_stdio_protos.h>

#ifdef DOPRAGMAS
#include <pragmas/exec_pragmas.h>
#include <pragmas/dos_pragmas.h>
#endiff

long main(void);

```

```

#define COMMANDBUFLNGTH 64
#define COMMANDLINELENGTH 512
#define PROMPTLENGTH 256

/* True if this is a System() Initiated shell */
#define SYSTEM ((ml->fn & 0x80000004) == 0x80000004)

/* true if this shell is executing a script */
#define ISSCRIPT (ml->mycli->cli_CurrentInput != ml->mycli->cli_StandardInput)

/* true if this shell is *not* executing a script */
#define NONSCRIPT (ml->mycli->cli_CurrentInput == ml->mycli->cli_StandardInput)

struct mylocals
{
    struct library *sysBase;
    struct library *dosBase;
    struct Process *myProcess;
    struct DosPacket *myPacket;
    long fn;
};

/* notice that fn is signed. Some conditionals
   in this code rely on this value being signed.
*/
struct CommandLineInterface *mycli;

/* define the library base labels (SysBase and DOSBase) that amiga.lib looks
   * for so we don't have to declare them as a global. Can't have global data in
   * resident code.
   */
#define SysBase (ml->sysBase)
#define DOSBase (ml->dosBase)

long mainshellloop(struct mylocals *);
long strlen(UBYTE *);
long main(void)
{
    struct mylocals globals; *ml = &globals;
    BPTR *segment;
    long shelltype, error;

    /* Proof, this shell has winked into existence. It could have come from the
       * user executing the "newshe'll" code via the newshe'll program, or it could
       * have come from some other application using one of the DOS calls that use
       * a shell, like System(). In any case, whatever caused this shell to wink
       * into existence will also cause a special startup packet to appear in this
       * process' message port. This packet is very personal and private to DOS
       * and probably will change with future versions of the OS, so don't worry
       * about what's in it. That would be bad.
       */
    error = RETURN_OK;
    /* Open libraries */
    SysBase = *((struct library **) 4U);
    if (DOSBase = OpenLibrary("dos.library", 37))
    {
        /* First, get the packet that the newshe'll segment sends. */
        globals.myPacket = WaitPkt();
        globals.myProcess = (struct Process *) FindTask(NULL);

        /* Some arcane magic here for the UserShell. We have to look at this
           * process' array of Segment pointers. If entry 4 in the array is NULL, we
           * have to move entry 3 to entry 4 and NULL entry 4. This is because entry
           * 3 will be used to store the seglist pointer for each program this shell
           * runs.
           */
        segment = (BPTR *) BADDR(globals.myProcess->pr_SegList);
        if (!segment[4])
        {
            segment[4] = segment[3];
            segment[3] = NULL;
        }
    }
}

```

Writing a UserShell

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/*
 * The packet that newshell sends tells us how the shell was invoked. The
 * dp_Res1 and dp_Res2 fields of the packet structure represent,
 * respectively, the high order bit and low order bit of a two-bit
 * bitfield. The following line of code will turn these values into a
 * value from 0 to 3:
 */
shelltype = (globals.mypacket->dp_Res1 == 0 ? 0 : 2) |
(globals.mypacket->dp_Res2 == 0 ? 0 : 1);

/*
 * at the moment, only the values 0 and 2 are defined. Type 0 is for Run,
 * Execute(), and System(). Type 2 is for NewShell and NewCli.
 */
if ((shelltype == 2) || (shelltype == 0))
{
    /*
     * These two functions CliInitNewcli() and CliInitRun() take care setting
     * up the shell's CommandLineInterface structure (current directories,
     * paths, input streams...) using the secret startup packet we got
     * earlier. They differ slightly in their setup based on the shell type.
     * The exact workings of these functions is private and personal to DOS,
     * and is subject to change. If you are wondering what exactly these
     * functions do, don't worry about it. That would also be bad.
     */
    if (shelltype == 0)
        globals.fn = CliInitRun(globals.mypacket);
    else

        /*
         * CliInitNewCli() handles the shell startup file (default is
         * s:Shell-startup) and stuffs a filehandle to it into
         * globals.mycli->cli_CurrentInput.
         */
        globals.fn = CliInitNewcli(globals.mypacket);

    /*
     * Definitions for the values of globals.fn:
     * Bit 31 Set to indicate flags are valid
     * Bit 3 Set to indicate asynch system call
     * Bit 2 Set if this is a System() call
     * Bit 1 Set if user provided input stream
     * Bit 0 Set if RUN provided output stream
     */

    /*
     * If the high bit of globals.fn is clear, check IoErr() to see if it
     * points to this process. If it does, there was an error with the
     * CliInitXxx... function. On an error, clean up and exit. You won't
     * have to return the packet if there was an error because the
     * CliInitXxxx function will take care of that.
     */
    if ((globals.fn & 0x80000000) == 0) /* Is high bit clear? */
    if ((struct Process *) IoErr() == globals.myprocess) /* is there an error? */
    {
        error = RETURN_FAIL;
        else if (shelltype == 0)
        {
            ReplyPkt(globals.mypacket,
                globals.mypacket->dp_Res1,
                globals.mypacket->dp_Res2);
            globals.mypacket = NULL;
        }
    }
    if (error != RETURN_FAIL)
    {
        /*
         * OK, no error. If this shell was invoked via NewShell or NewCLI
         * (shelltype == 2), or if this is an asynchronous System() initiated
         * shell, return the startup message. Although this example doesn't
         * do it, if shelltype == 0, you can wait to reply the packet until you
         * try to LoadSeg() your first command (to avoid disk gronking). When
         * you use ReplyPkt() to reply the packet, use it like it appears below
         * to avoid losing error codes set up by CliInitXxxx.
         */
    }
}

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if (((globals.fn & 0x80000000C) == 0x80000000C) || (shelltype == 2))
{
    ReplyPkt(globals.mypacket,
        globals.mypacket->dp_Res1,
        globals.mypacket->dp_Res2);
    globals.mypacket = NULL;
}

if (globals.mycli = Cli())
{
    /* Set up local shell variables and any custom set up here */
    globals.mycli->cli_ReturnCode = 0;
    globals.mycli->cli_Result2 = 0;
    globals.myprocess->pr_HomeDir = NULL;

    /* Ready to start processing commands */
    error = mainshellloop(ml);
    if (globals.fn < 0) /* if we got valid flags from
                        * CliInitXxxx (High bit of fn is set). */
    {
        Flush(Output());
        /* if user DID NOT provide input stream, close standardinput */
        if ((globals.fn & 2) == 0)
            Close(globals.mycli->cli_StandardInput);

        /* if RUN provided output stream, close it */
        if ((globals.fn & 1) == 1)
        {
            Flush(globals.mycli->cli_StandardOutput);
            Close(globals.mycli->cli_StandardOutput);
        }

        /* If we didn't send the packet back yet, send it back */
        if (globals.mypacket)
            ReplyPkt(globals.mypacket, error, globals.mypacket->dp_Res2);
    }
    else
    /*
     * the flags weren't valid so close the Standard I/O handles if
     * they still exist.
     */
    {
        if (globals.mycli->cli_StandardOutput)
        {
            Flush(globals.mycli->cli_StandardOutput);
            Close(globals.mycli->cli_StandardOutput);
        }
        if (globals.mycli->cli_StandardInput)
        {
            Flush(globals.mycli->cli_StandardInput);
            Close(globals.mycli->cli_StandardInput);
        }
    }
    /* release the process' lock on the current directory */
    Unlock(globals.myprocess->pr_CurrentDir);
}
else
    error = RETURN_FAIL; /* I have a NULL CLI! */
}
else
    /* shelltype != 0 or 2 */
    {
        error = RETURN_FAIL;
        ReplyPkt(globals.mypacket,
            globals.mypacket->dp_Res1,
            globals.mypacket->dp_Res2);
    }
CloseLibrary(DOSBase);
else
    error = RETURN_FAIL;

return error;
}

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AmigaDOS

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long mainshellloop(struct myLocals * ml)
{
    BOOL done = FALSE;
    unsigned char ch, *prompt, *command, *commandname, *cmd, *cmdname;
    struct Segment *cmdseg;
    long result;
    WORD x;

    ml->mycli->cli_FailLevel = RETURN_FAIL;

    if (command = (char *) AllocVec(COMMANDLINELENGTH +
        PROMPTLENGTH, MEMF_CLEAR))
    {
        commandname = &(command[COMMANDLINELENGTH]);
        prompt = &(command[COMMANDLINELENGTH + COMMANDBUFLLENGTH]);
        do
        {
            /* Make sure the shell looks to cli_CurrentInput for its command lines */
            SelectInput(ml->mycli->cli_CurrentInput);

            /* Is this an interactive shell? */
            ml->mycli->cli_Interactive =
            /* If this is not a background CLI, and */
            (((ml->mycli->cli_Background)) &&
            /* Input has not been redirected to an script file, and */
            NOTSCRIPT &&
            /* This shell was not started from System() */
            (!SYSTEM)) ? DOSTRUE : DOSTRUE;

            /* If this is a script and the user hit CTRL-D, break out of the script */
            if (!(!(!SetSignal(0L, SIGBREAKF_CTRL_C |
                SIGBREAKF_CTRL_D |
                SIGBREAKF_CTRL_E |
                SIGBREAKF_CTRL_F) & SIGBREAKF_CTRL_D) &&
                (!SYSTEM) && (!SCRIPT)))
            {
                /* If this shell is interactive and there is a prompt, print it */
                /* (unless, of course, this was created by Run, etc) */
                if (ml->mycli->cli_Interactive == DOSTRUE && (ml->mycli->cli_Background))
                {
                    /* If this wasn't an example, I would probably change the prompt
                     * here, probably to reflect the name of the current directory.
                     */
                    /* Print the prompt */
                    if (GetPrompt(prompt, 256))
                    {
                        fputs(Output(), prompt);
                        /* Make sure the prompt gets printed */
                        Flush(Output());
                    }
                }
                /* Get Command */
                if (Fgets(ml->mycli->cli_CurrentInput, command, COMMANDLINELENGTH))
                {
                    cmd = command;
                    /* skip leading spaces in command line */
                    while (*cmd == ' ')
                        cmd++;

                    /* If I was bothering to deal with aliases, I would probably resolve
                     * them here.
                     */
                    cmdname = commandname;
                    x = 0;
                    /* copy the actual command from the cmd buffer */
                    while ((*cmd >= '0') && (*cmd <= 'z') && (x < (COMMANDBUFLLENGTH - 1)))
                    {
                        *cmdname++ = *cmd++;
                    }
                    cmdname = '\0';
                }
            }
        } while (1);
    }
}

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/*
 * OK, now we have the actual command in commandname. Using it we can
 * find the actual executable code. The command could come from
 * several sources:
 *
 * The resident list
 * The shell (an internal command)
 * disk (from either an absolute or relative path)
 *
 * This example only looks through the resident list for commands. A
 * real shell would also try to load a command from disk if the
 * command is not present in the resident list (or the command is not
 * internal to the shell.
 */

/* Search resident list for the command */
Forbidden();
if (!(!cmdseg = FindSegment(commandname, NULL, FALSE)))
    cmdseg = FindSegment(commandname, NULL, TRUE);
if (cmdseg)
{
    if ((cmdseg->seg_UC < CMD_DISABLED) ||
        (cmdseg->seg_UC == CMD_SYSTEM))
        cmdseg = NULL;
    else if (cmdseg->seg_UC >= 0)
        cmdseg->seg_UC++;
}
Permit();

/* If !cmdseg, the command was not in the resident list. If I were
 * bothering to look for commands on disk, I would try to load the
 * command here. If I has successfully loaded a command and was
 * going to execute it, I would have to set ml->myprocess->pr_HomeDir
 * to be a DpBlock() of the directory I loaded the command from. I
 * don't do this for commands from the resident list because they
 * have no home directory.
 */

/* If we did find a command, run it */
if (cmdseg)
{
    /* Clear the error field before executing the command */
    SetError(0);

    SetProgramName(commandname);
    ml->mycli->cli_Module = cmdseg->seg_Seg;

    /* Set the I/O streams to their defaults. NOTE: StandardInput, NOT
     * CurrentInput! The Execute command will cause nasty things to
     * happen if you use CurrentInput, since it must close that in
     * order to change the input stream to the next file. Obviously,
     * this only applies if you're using the normal AmigaDOS Execute
     * command for scripts.
     */
    SelectInput(ml->mycli->cli_StandardInput);
    SelectOutput(ml->mycli->cli_StandardOutput);

    /* If I were doing redirection, the I/O handles above would be the
     * redirection handles.
     */

    /* Run the command */
    result = RunCommand(ml->mycli->cli_Module,
        cmd,
        ml->mycli->cli_DefaultStack * 4),
        strlen(cmd));

    /* OK, we returned from the command. Fill in any error codes in
     * the appropriate CLI fields.
     */
    ml->mycli->cli_ReturnCode = result;
    ml->mycli->cli_Result2 = IoErr();
}

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/* If I had bothered to load code from an executable file on disk,
 * I would have to unload it now. Since I didn't, all I have to do
 * is NULL cli_Module.
 */
ml->mycli->cli_Module = NULL;

SetProgramName("");
Forbid();
if (cmdseg->seg_UC > 0)
    cmdseg->seg_UC--;
Permit();
cmdseg = NULL;
}
else
{
    /* we couldn't find the command. Print an error message unless the
     * command starts with a non-alphanumeric character (like a
     * carriage return) or the first character is a comment character.
     */
    if ((commandname[0] >= '0') &&
        (commandname[0] <= 'z') &&
        (commandname[0] != ';'))
    {
        PutStr(commandname);
        PutStr(": Command not found\n");
        Flush(Output());
    }
}

/* if you set up redirection I/O handles for the command don't forget
 * to flush and close them.
 */

/* Make sure the proper I/O handles are in place. */
SelectInput(ml->mycli->cli_CurrentInput);
SelectOutput(ml->mycli->cli_StandardOutput);

/* Get rid of any unused data left in the buffer */
ch = UnGetC(Input(), -1) ? '\0' : '\n';
while ((ch != '\n') && (ch != ENDSTREAMCH))
    ch = FGetC(Input());
if (ch == ENDSTREAMCH)
    done = TRUE;
}
else
    done = TRUE;          /* We got an EOF when reading in a
                           * command */
if (done)
{
    if (ISSCRIPT)
    {
        done = FALSE;    /* this is a script (which could be
                           * s:shell-startup), so don't quit, just
                           * exit the script and set up IO
                           * handles. */

        /* Close the script file */
        Close(ml->mycli->cli_CurrentInput);
        /* Reset the input to what we started with */
        SelectInput(ml->mycli->cli_StandardInput);
        ml->mycli->cli_CurrentInput = ml->mycli->cli_StandardInput;

        /* Restore Fail Level after executing a script */
        ml->mycli->cli_FailLevel = RETURN_ERROR;

        /* if the script created a file, delete it */
        if (((char *) BADDR(ml->mycli->cli_CommandFile))[0])
        {
            cmd = (char *) BADDR(ml->mycli->cli_CommandFile);
            CopyMem(&(cmd[1]), command, (LONG) cmd[0]);
            command[cmd[0]] = '\0';
            DeleteFile(command);
            cmd[0] = '\0';
        }
    }
}
}

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}
else
    /* Somebody hit CTRL_D in a script */
{
    /* print the string associated with error #304 */
    PrintFault(304, "MyShell");
    /* Close the script file */
    Close(ml->mycli->cli_CurrentInput);
    /* Reset the input to what we started with */
    SelectInput(ml->mycli->cli_StandardInput);
    ml->mycli->cli_CurrentInput = ml->mycli->cli_StandardInput;

    cmd = (char *) BADDR(ml->mycli->cli_CommandFile);
    cmd[0] = '\0';
}
/* this takes care of some problems certain programs caused */
if (SYSTEM && NOTSCRIPT)
    done = TRUE;

} while (!done);
FreeVec((void *) command);
}
return result;
}

long strlen(UBYTE * string)
{
    long    x = 0L;

    while (string[x]) x++;
    return x;
}

/* RestoreShell.c - Execute me to compile me with Lattice 5.10b
LC -bl -cfist -v -d0 -j73 RestoreShell.c
Blink FROM lib:c.o RestoreShell.o TO RestoreShell LIBRARY lib:lc.lib lib:amiga.lib
smallcode smalldata
quit
*/
/* restore the BootShell as the UserShell. Note that this
only switches back the BootShell, it does not unload the
current user shell ("shell" on the resident list) as it
is possible that some instance of it can still be running.
*/
#include <exec/types.h>
#include <dos/dosextens.h>
#include <clib/exec_protos.h>
#include <clib/dos_protos.h>

#ifdef LATTICE
int CXBRK(void) { return(0); } /* Disable Lattice CTRL/C handling */
int chkabort(void) { return(0); }
#endif

UBYTE *vers = "\0$VER: RestoreShell 1.0";

void main(void)
{
    struct Segment
    {
        *bootshell_seg,
        *shell_seg;

        Forbid();
        shell_seg = FindSegment("shell", NULL, CMD_SYSTEM);
        bootshell_seg = FindSegment("bootshell", NULL, CMD_SYSTEM);
        if (bootshell_seg)
            shell_seg->seg_Seg = bootshell_seg->seg_Seg;
        Permit();
    }
}

```

