

## How to use POSIX Threads with the DNP/1110

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Some C programs need additional libraries. A typical example is the usage of POSIX Threads. The document describes how to find out what libraries are necessary and how to install these libraries within the DNP/1110 file space.

- **1. Step:** Generate a C source code. Make sure to include **pthread.h**. Use the Thread functions. The following code is a sample for a simple program with POSIX Threads.

```
#include <stdio.h>
#include <unistd.h>
#include <stdlib.h>
#include <pthread.h>

void *thread_function (void);

int counter= 0;

int main (void)
{
    int iThread, mirror;
    pthread_t mythread;

    iThread= pthread_create (&mythread, NULL, thread_function, NULL);
    if (iThread != 0) {
        printf ("Can't create thread...\n");
        exit (EXIT_FAILURE);
    }

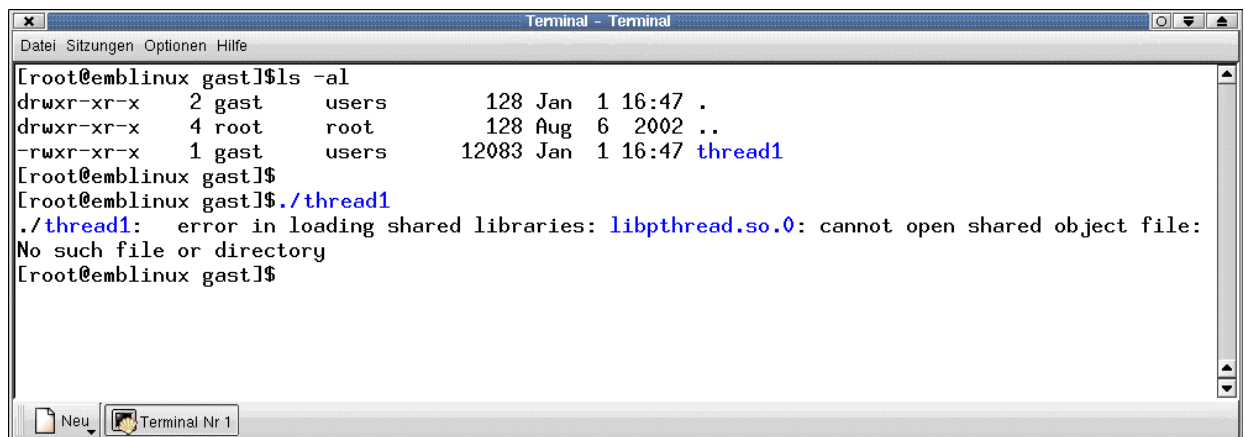
    printf ("Counter (incremented by Thread)= ");
    mirror= counter;
    while (1) {
        if (mirror != counter) {
            printf ("%04d\b\b\b\b", counter);
            fflush (stdout);
            mirror= counter;
        }
    }
}

void *thread_function (void)
{
    while (1) {
        counter++;
        sleep (1);
    }
}
```

- **2. Step:** Run the Linux/GNU C cross compiler and build a executable from your C source code file. The following command lines assumes that **thread1.c** is your C source code file and **thread1** the name of the executable.

```
/usr/local/arm-linux/bin/arm-linux-gcc -pthread -o thread1 thread1.c
```

- **3. Step:** Transfer the new executable with FTP to the DNP/1110.
- **4. Step:** Try to run the **thread1** executable on the DNP/1110. You get an error message for any missing library. In our case the executable **thread1** is missing the library **libpthread.so.0**.



```
Terminal - Terminal
Datei Sitzungen Optionen Hilfe
[root@emblinux gast]$ls -al
drwxr-xr-x  2 gast  users      128 Jan  1 16:47 .
drwxr-xr-x  4 root  root       128 Aug  6 2002 ..
-rwxr-xr-x  1 gast  users     12083 Jan  1 16:47 thread1
[root@emblinux gast]$
[root@emblinux gast]$./thread1
./thread1: error in loading shared libraries: libpthread.so.0: cannot open shared object file:
No such file or directory
[root@emblinux gast]$
```

- **5. Step:** Transfer the missing library **libpthread.so.0** with FTP direct to the DNP/1110 **/lib** directory. Make sure that your FTP client owns the necessary write access rights. You find this library in the directory **/usr/local/arm-linux/arm-linux/lib** of your development system.
- **6. Step:** Run the executable again. If your executable needs other or more libraries you get an error message. Repeat the steps for any additional library. Finally rebuild your RIMAGE.GZ to have the additional libraries permanent within **/lib**.