

# Compile LTR

## Compile

Compiling the LFM requires two steps: configure & compile.

- [Compile](#)
  - [Configure Make.\\$MACHINE:](#)
  - [Compile](#)
    - [Build everything](#)
    - [À la carte](#)
- [Installation](#)
  - [Kicking the Tires](#)

## Configure Make . \$MACHINE:

Compiler settings and library locations should be specified in a `Make . $MACHINE` file. The code ships with a set of pre-configured `Make . $MACHINE` files in the `env` directory.

If your environment is [listed here](#), simply set the environment variable `$MACHINE` appropriately. If your environment is not listed, create a copy of one of the pre-existing `Make . $MACHINE` files as a template for your own system inside the `env` directory.

## Compile

Once you have a proper `Make . $MACHINE` file, you are ready to compile. The LTR code base contains several models that may be coupled together:

- LFM (Stand-alone LFM is deprecated & unsupported. Try LFM-MIX instead)
- LFM-MIX
- LFM-RCM (Ongoing testing & development--not ready for general-purpose use yet!)
- CMIT (LFM, MIX, TIEGCM)
- TIEGCM

Additionally, the LFM can be compiled in a variety of resolutions:

- Single: 53-24-32 on 8 processors
- Double: 53-48-64 on 24 processors
- Quad: 106-96-128 on 144 processors
- custom: Choose the number of points & distribution of processors

There are two ways to build the code:

1. Compile Everything
2. Compile a particular model at a particular resolution (à la carte).

## Build everything

The entire code base can be compiled with one command:

```
gmake all-resolutions
```

This may take a while and all results will be stored in the `build` directory.

## À la carte

You can compile a particular model at a particular resolution via the following command:

```
gmake (input-code) RESOLUTION=(input-resolution)
```

where `(input-code)` is one of:

- LFM
- LFM-MIX
- LFM-RCM
- CMIT
- TIEGCM

and `RESOLUTION = (input-resolution)` is one of:

- `RESOLUTION=single`
  - 53x24x32 grid points
  - Distributed on 8 processors
- `RESOLUTION=double`
  - 53x48x64 grid points
  - Distributed on 24 processors
- `RESOLUTION=quad`
  - 106x96x128 grid points
  - Distributed on 144 processors

See the [LFM Grid Resolution](#) page for more information.

## Installation

Once you have finished compiling the code, the code will be installed into the "build" directory. Before you can run the code, you need to set some environment variables. See the [Environment Variables page](#) for details.

## Kicking the Tires

Now you are ready to take the LTR for a test drive. See the [Run the Code](#) page to learn how to setup & execute a simple test run.