

Chapter 1

Dish for babies

1.1 babies modes

There are four modes for *babies*.

- l normal Linux mode
- r RTLinux mode
- c Shared memory mode
- s Scaler mode
- d Dummy driver mode

For normal Linux and RTLinux modes, *babies* receives data from device drivers. Shared memory, Scaler and Dummy driver modes communicate with other process (user program) via shared memory. Figure 1.1 shows the way to communicate with *babies*. Scaler and dummy driver modes are omitted. Their methods are similar to shared memory mode one.

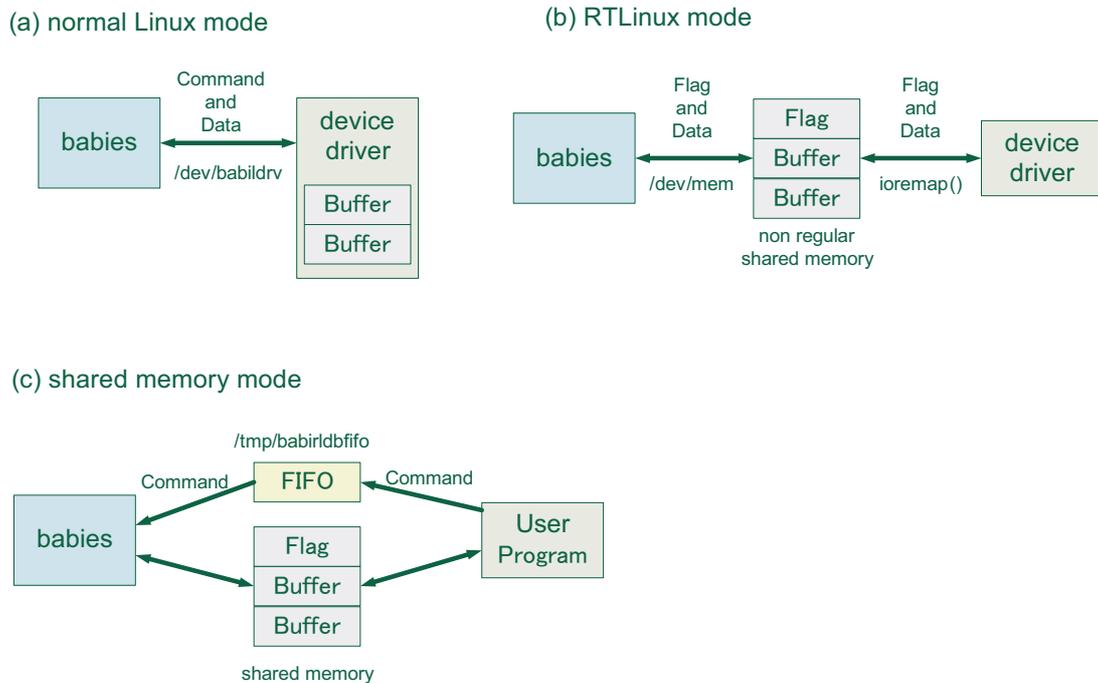


Figure 1.1: Data and command communication method for *babies*.

1.2 Shared memory mode

To communicate with other user processes, two regions of shared memory and one FIFO are used.

The following is a list of important variables in *babies*.

```

For Data (shmptr)
  Shared memory   Key   = EFSHMKEY + EFN = 523400 + EFN
                  Size  = EF_SHM_SIZE  = 524300

For Handshake (fifofd)
  FIFO           path = COMFIFO = /tmp/babirldbffifo

```

EFSHMKEY, EF_SHM_SIZE, and EFSEMKEY are written in include/bi-config.h .

This FIFO will be created by *babies* automatically. *shmptr*, and *fifofd* are memory pointer and file handler in *babies.c*, respectively.

1.2.1 Start sequence

At the start time, *babies* changes *shmptr* + EF_SHM_RUN to be '1'. (In this source code of *babies*, *shmptr* + EF_SHM_RUN is defined as **babiesrun*.) Next, user program will do its initialization routine. When this initialization is finished, *shmptr* + EF_SHM_SSF have to be '1' by user program. *babies* do not send 'start ack' to *babild* until *shmptr* + EF_SHM_SSF is changed to be '1'.

```

Before start
  shmptr + EF_SHM_RUN = 0
  shmptr + EF_SHM_SSF = 0

Start time
  shmptr + EF_SHM_RUN = 1 (by babies)
  shmptr + EF_SHM_SSF = 1 (by user program)

```

1.2.2 Data copy sequence

To serve data to *babies* from user program, handshake with FIFO is used. *shmptr* + EF_SHM_FLAG1 and *shmptr* + EF_SHM_FLAG2 are flags for data occupancy of buffer. When both flags are '1' which means "both buffer is full", user program must not copy data to shared memory. If *shmptr* + EF_SHM_FLAG1 and/or *shmptr* + EF_SHM_FLAG2 are '0', user program can copy data to shared memory. Memory pointers are *shmptr* + EF_SHM_DATA1 for buffer 1 and *shmptr* + EF_SHM_DATA2 for buffer 2. When data is copied to buffer 1, user program also puts '0' to the FIFO. For buffer 2 case, user program have to put '1' to the FIFO. *babies* receives the values of '0' or '1' from the FIFO. Next, *babies* send data to *babild* from *shmptr* + EF_SHM_DATA1/2. After the data transfer, *babies* writes '0' to *shmptr* + EF_SHM_FLAG1/2.

```

User program
  check shmptr + EF_SHM_FLAG1/2
  if 0, copy data to shmptr + EF_SHM_DATA1/2
  put 0 or 1 to FIFO

babies
  polling FIFO
  when the values of 0 or 1 come, send data to babild from shmptr + EF_SHM_DATA1/2
  write 0 to shmptr + EF_SHM_FLAG1/2

```

1.2.3 Stop sequence

When *babies* receives the stop command from *babild*, **babiesrun* is changed to be '0'. And then, user program launches stop routine. At the end of stop routine, user program writes *shmptr* + EF_SHM_SSF = 0 and puts '-1' to the FIFO.

```

Before stop (running)
  shmptr + EF_SHM_RUN = 1
  shmptr + EF_SHM_SSF = 1

Stop time
  shmptr + EF_SHM_RUN = 0 (by babies)
  user program do stop routine
  shmptr + EF_SHM_SSF = 0 (by user program)
  put -1 to FIFO          (by user program)

```

1.2.4 dexecuter

'devtool/dexecuter.c' is a good example for this shared memory mode. This program generates dummy data with given event rate and size. You can test this by following commands:

1. babiau/babiau
2. babies/babies -c 10
3. devtool/dexecuter 10 100 100 30 5000
4. babicon/babicon

In this case, the event fragment number is 10. Arguments of *dexecuter* are listed:

```

dexecuter EFN EVTRATE EVTLEN DISPERSION EFSIZE
EFN       : Event Fragment Number 0-254
EVTRATE   : Event rate 1-10000 (evt/s)
EVTLEN    : Length of one event 1-200 (short word)
DISPERSION : Dispersion of the length of one event 1-100 (short word)
EFSIZE    : Block size 1-20000 (short word)

```

To terminate *dexecuter*, please enter Ctrl-C.

'devtool/dexecuterts.c' is almost the same as *dexecuter*, except for its event header includes time stamp. Within *dexecuterts*, the time stamp value is equal to the event number.