2.4GHZ System Operation

1.Access method

1.1 Transfer format & rate

The transfer format & rate of our system is as follow.

Table 1.1 Transfer method

Access method	FDMA-TDD
Channel number	40 channel
Channel spacing	1.8 MHz
Moduration method	DBSPK
Baseband transfer	960 kbps
Spread method	Direct sequence Spread specturm
Chip rate	12 chips/bit
Data transfer rate	80 kbps

1.2 Channel Number & Frequencies

RF channels occupy the frequency band 2.4G – 2.48GHZ are numbered 1to 40 .
RF channel numbers & center frequencies are specified as follows.

Table 1.2 Channel number & Channel frequency

Channel No.	Channel Center Frequency (GHz	Channel No.	Channel Center Frequency (GHz)
1	2.4048	21	2.4408
2	2.4066	22	2.4426
3	2.4088	23	2.4444
4	2.4102	24	2.4462
5	2.4120	25	2.4480
6	2.4138	26	2.4498
7	2.4156	27	2.4516
8	2.4174	28	2.4534
9	2.4192	29	2.4552
10	2.4210	30	2.4570
11	2.4228	31	2.4588
12	2.4246	32	2.4606
13	2.4264	33	2.4624
14	2.4282	34	2.4642
15	2.4300	35	2.4660
16	2.4318	36	2.4678
17	2.4336	37	2.4696
18	2.4354	38	2.4714
19	2.4372	39	2.4372
20	2.4390	40	2.4750

2. Protocol

2.1 General

This system realizes the TX/RX superframe by TDD system. The relation of master/slave dose not decide identification regarding the protocol between BS and HS, but the initiated side is the master and the requested side is the slave when the RF link has been established.

2.2 Initial acquisition

In order to establish the RF link between BS and HS, both of BS and HS need to have the same system ID. When "power" is applied to this system, the system have to do Initial Acquisition in order to have the same system ID. It is to exchange a parameter when the HS is parked on the BS, as soon as the system do System Parameters Re-initilization.

2.3 System parameter re-initilization

This System Parameters Re-initilization can realize that the HS is parked on the BS. So after the BS recognized to be parked the HS, the BS calculates a system parameter, and then it outputs this data from the ARTO port, and then the system establishs the RF link. In order to establish this link, the HS send the A-Frame to the BS after the HS received the system parameter, and then the BS send the A-Frame to the HS. The process of System Parameters Re-initilization is as follows.

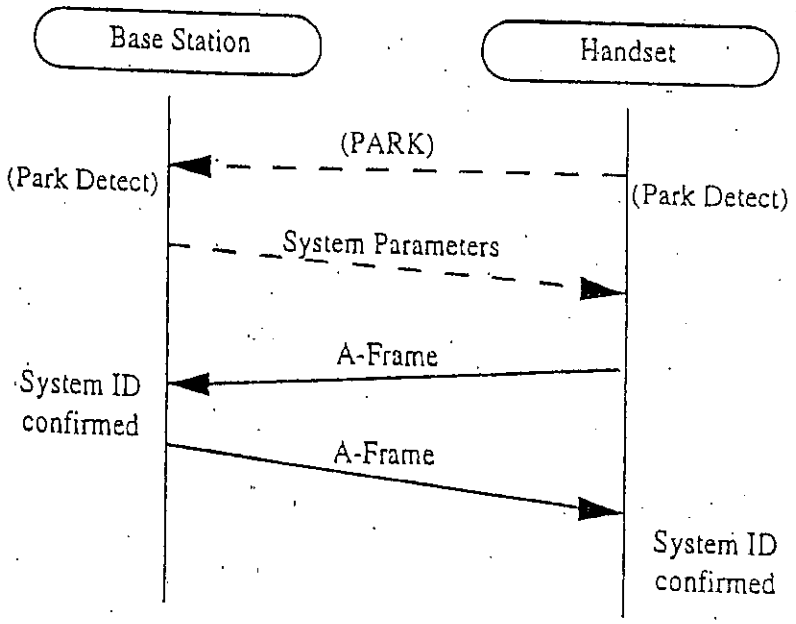

Fig 2.1 System Parameters Re-initialization

2.4 Stand-by Mode Operation

2.4.1 HS

When the HS is the stand-by mode(sleep mode), the HS do the intermittent operation for power save, because the HS is the battery operation.
This process of stand-by mode operation is as follows.

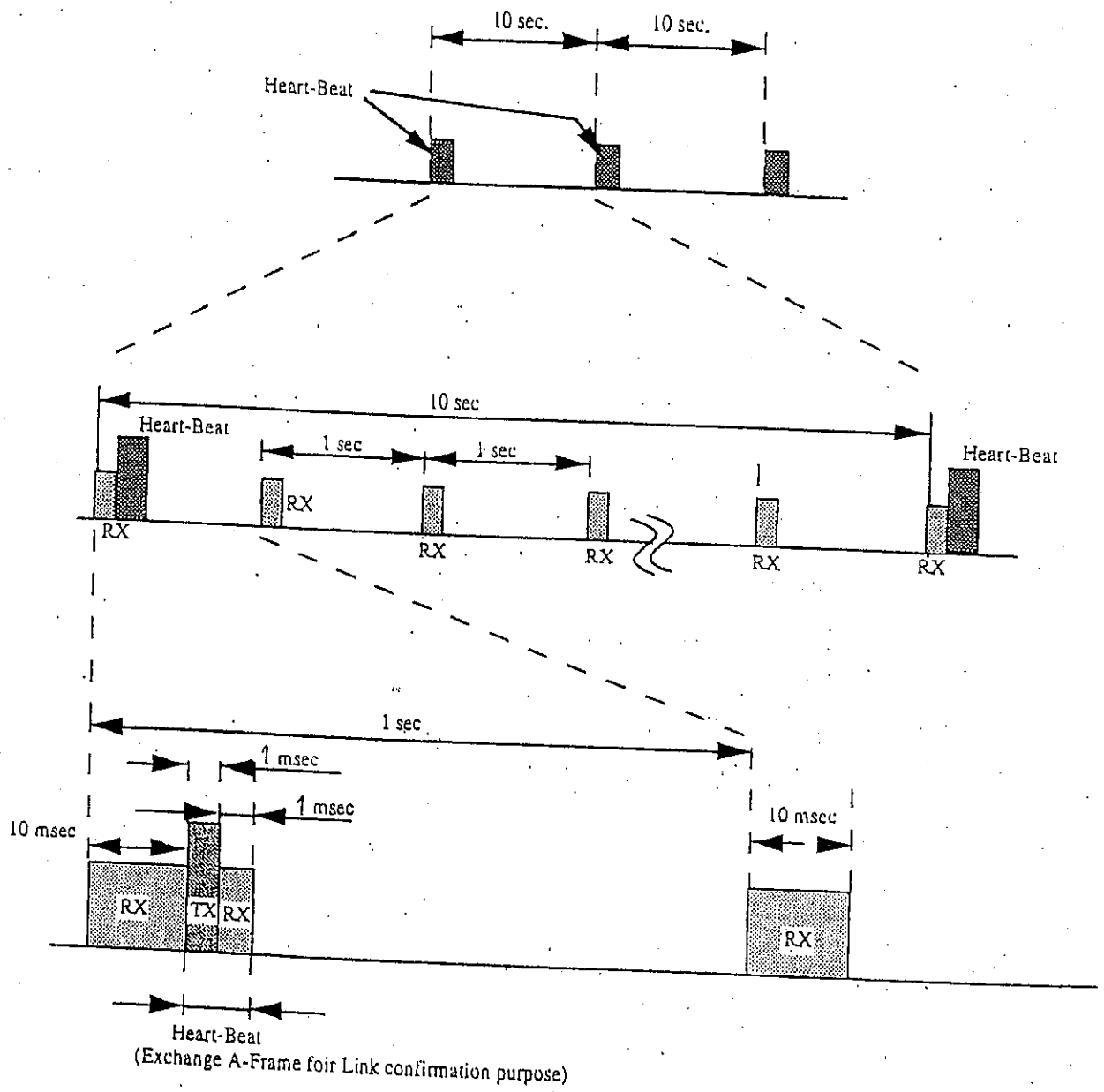

Fig.2.2 Stand-by mode operation(HS)

2.4.2 BS

The BS is supplied the power by AC line. While the BS is the stand-by, the BS is always a wake state. While theBS monitors the current channel, the BS monitors also the other channel at the same time.
Because if the current channel can not use by some interference,
the system needs the clear channel information as a part of system parameter for a channel hop.
If the BS can not receive the A-Frame of Heart-beat from the HS, it become "link error", and the system become 'error recovery mode'.

2.5 Link Establishment

Accoding to the following Fig. 2.1, the requested side for link establishment is the master.
The system have to exchange the A-Frame for link establishment, and each system ID should be the same ID, and then the system link is established.
The protocol and timing chart of link establishment are as follows.

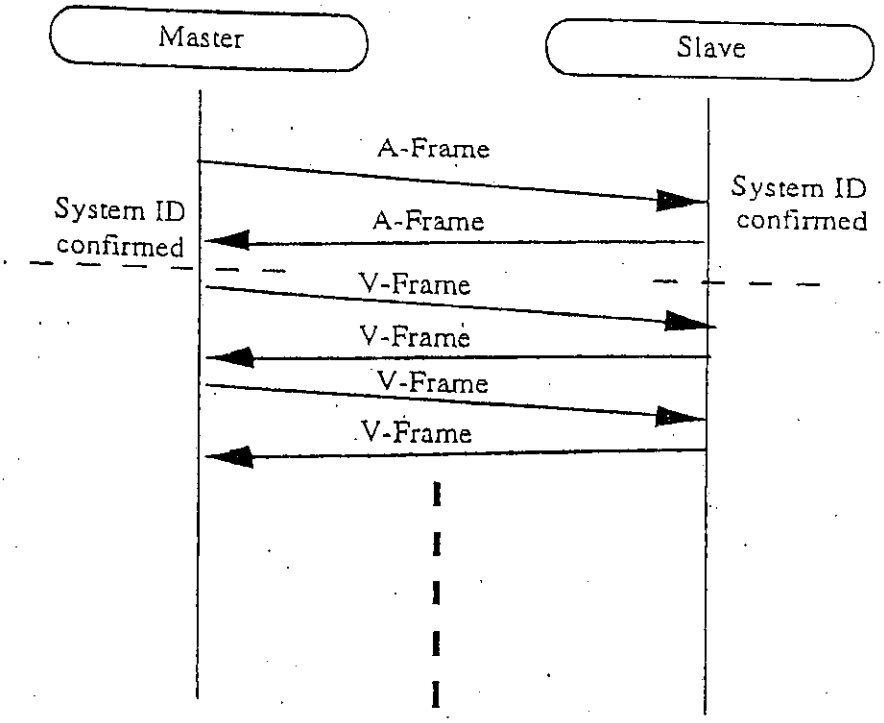

Fig. 2.3 Link Establishment protocol

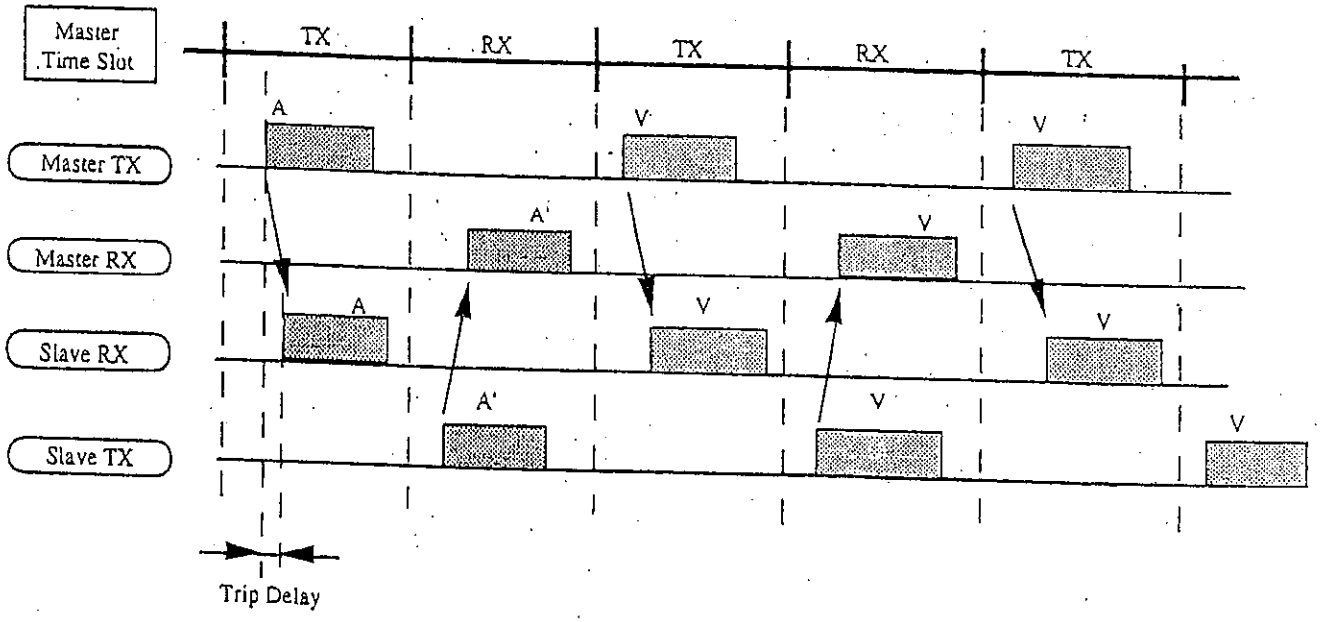

Fig. 2.4 Link Establishment Timing Chart

2.5 State Change / Tarmination

After the RF link between HS and BS was established, a movement of each state(State: ON-Hook, OFF-Hook, PAGE, InterCom, etc) is sent through supervisory bits.

2.6 Error Recovery

In case of the following situation, The system becomes "Error Recovery Mode".

(1) The system failed to move to "Heart-Beat" during "Stand-by mode, or failed "link establishment".

(2) The system failed to keep the link.