

1. Modified Tree identify

1.1. Additional PHY timing constants

| Timing constant | Minimum | Maximum | Comment |
|-----------------|--------------|--------------|--|
| LONG_DIST_TIME | | 0.15 μ s | Transition timing from the traditional re resolution method of root contention to the another method for long distance |
| BACK_OFF_TIME | 0.04 μ s | | Time to wait in state T4 before transition to state T2 |

1.2. Cable PHY code definition

```
timer tx_timer; // timer for measurement the duration of tx_parent_notify
timer rx_timer; // timer for measurement the duration of rx_parent_notify
int tx_prop_timer; // the duration of tx_parent_notify
int rx_prop_timer // the duration of rx_parent_notify
boolean rx_timer_off // set when reception of rx_parent_notify is complete
baserate_time long_contend_time // amount of time to wait for re-start tx_parent_notify
```

1.3. Tree-ID state machine

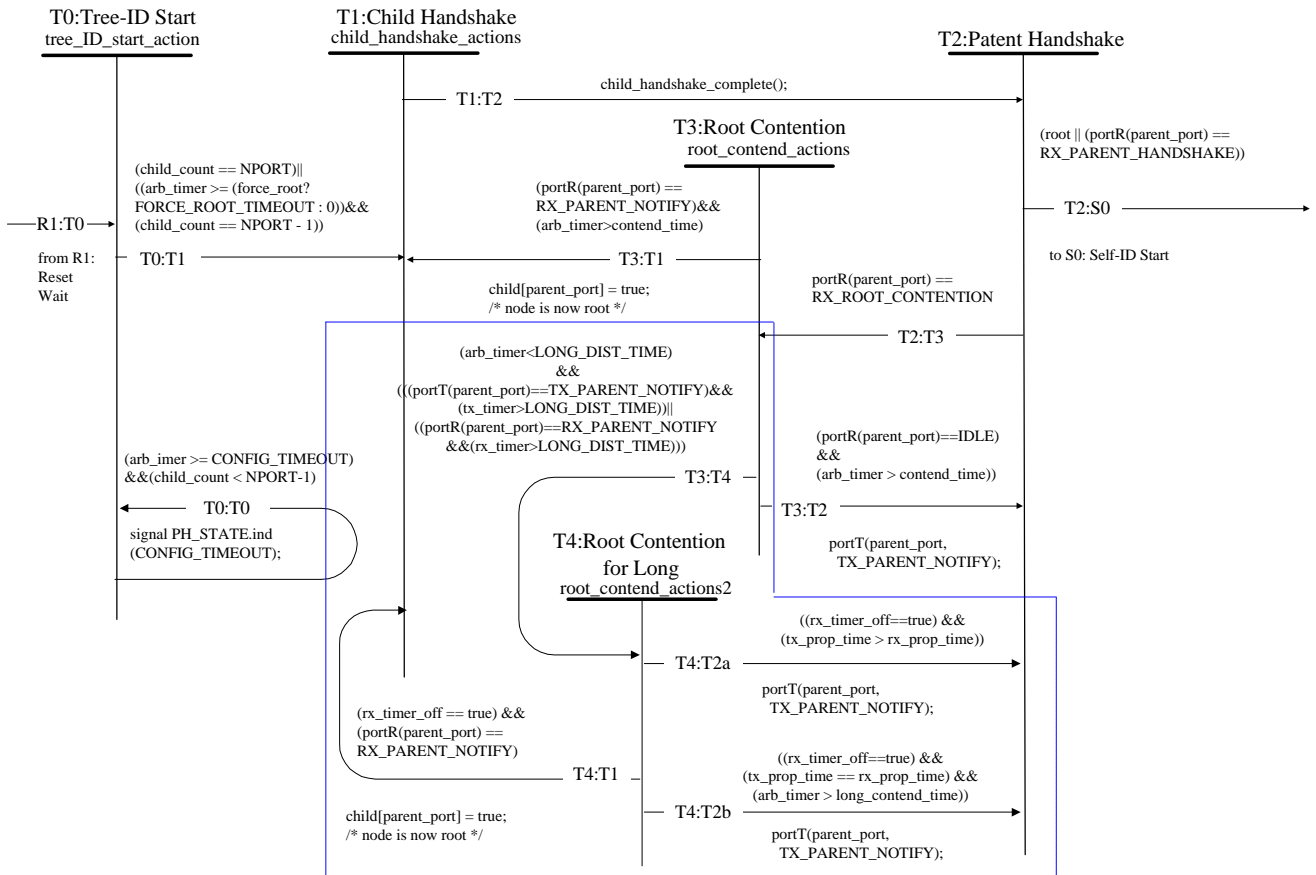


Figure 1 : Modified Tree-ID state machine

The parts enclosed by blue dashed lines is added.

1.3.1.Tree-ID state machine notes

State T4 : Root Contention for long cable. At this point, both nodes compare the duration of `tx_parent_notify` and the duration of `rx_parent_notify`. If the duration of `tx_parent_notify` is longer than the duration of `rx_parent_notify`, the node will be child node. If the duration of `rx_parent_notify` is longer than the duration of `tx_parent_notify`, the node will be parent node, that is, root.

Transition T3 : T4. When `tx_timer` or `rx_timer` is more than `LONG_DIST_TIME`, the resolution method for long cable is applied.

Transition T4 : T1. If the duration of `rx_parent_notify` is longer than the duration of `tx_parent_notify` and the node receives the `rx_parent_notify`, the node take on the role of bus root.

Transition T4 : T2a. If the duration of `tx_parent_notify` is longer than the duration of

rx_parent_notify, the node once again sends the tx_parent_notify signal.

Transition T4 : T2b. If the duration of tx_parent_notify is equal to the duration of rx_parent_notify, the nodes wait for long_contend_time in state T4, then once again send the tx_parent_notify signal.

1.3.2.Tree-ID actions and conditions

Table 1 : modified IEEE 1394-1995 Table 4-45

```

void tree_ID_start_actions() {
int i, temp_count;
arb_timer = 0; // start timer
while(true) { // loop forever
temp_count = 0; // temporary child counter
for (i = 0; i < NPORT; i++)
if (~connected[i] || portR(i) == RX_PARENT_NOTIFY) {
parent" // when unconnected or receiving "you are my
child[i] = true; // set child flag
temp_count++; // and increment counter
child_count = temp_count; // set current child count
} // end of forever loop
}
void child_handshake_actions() {
int i;
root = true; // root will stay true if all ports are child ports
for (i = 0; i < NPORT; i++) {
if (connected[i] && child[i])
portT(i, TX_CHILD_NOTIFY); // you are my child
else if (connected[i]) {
portT(i, TX_PARENT_NOTIFY); // you are my parent
parent_port = i; // there is at most one port with child==false
root = false; // cannot be root since there is a parent
tx_timer=0; // start transmission timer
}
}
boolean child_handshake_complete() { // true id all active children in "Start Self_ID"
int i;

```

```

for (i = 0; i < NPORT; i++)
    if (child[i] && connected[i] && (portR(i) != RX_CHILD_HANDSHAKE)
        return false;                // active child not giving "you are my parent"
return true;                          // will also be true if there are no active
children
}
void root_contend_actions() {
int i;
contend_time = (random_bool() ? CONTEND_SLOW : CONTEND_FAST);
tx_prop_time = tx_timer;           // set transmission time
for (i = 0; i < NPORT; i++) {
    if (child[i])
        portT(i, TX_CHILD_NOTIFY);    // you are my child
    else
        portT(i, IDLE);                // abandon "you are my parent" request
}
arb_timer = 0;                        // start arbitration timer
rx_timer = 0;                       // start reception timer
}

void root_contend_actions2() {
long_contend_time = ( random_bool() ? 0 : BACK_OFF_TIME );
while ( portR(parent_port) == RX_PARENT_NOTIFY ) {
    rx_timer_off = false;
}
if ( portR(parent_port) == IDLE ) {
    rx_timer_off = true;
    rx_prop_time = rx_timer;
    arb_timer = 0;           // start arbitration timer
}
}

```

Example : The distance between nodes is 50m

