```
hcond_def  THM

⊢  ∀'a:S.
|  equal
|  (cond
|  ,λt:hbool. λt1:'a. λt2:'a. select
|                             (λx:'a. and
|                                     (implies(equal(t,t),equal(x,t1))
|                                     ,implies
|                                      (equal(t,f)
|                                      ,equal(x,t2)))))
| by Simpset ['hol_to_nuprl'] THEN Simp THEN StrongAuto
|
1. 'a : S
⊢  (λb:𝔹. λp:'a. λq:'a. if b then p else q fi )
|  =
|  (λt:𝔹. λt1:'a. λt2:'a. @_b x:'a
|                           ((t =_b true₂)⇒₂(x =_b t1)∧₂
|                           (t =_b false₂)⇒₂(x =_b t2)))
| by Simpset ['ext'] THEN Simp THEN StrongAuto
|
1. 'a : S
2. t : 𝔹
3. t1 : 'a
4. t2 : 'a
⊢  if t then t1 else t2 fi
|  =
|  (@_b x:'a. ((t =_b true₂)⇒₂(x =_b t1)∧₂(t =_b false₂)⇒₂(x =_b t2)))
| by Simpset ['bequal'] THEN Simp THEN StrongAuto
|
1. 'a : S
2. t : 𝔹
3. t1 : 'a
4. t2 : 'a
⊢  if t then t1 else t2 fi
|  =
|  (@_b x:'a. ((t =_b true₂)⇒₂(x =_b t1)∧₂(t =_b false₂)⇒₂(x =_b t2)))
| by Unab ['bchoose']
|    THEN
|    LemmaRW
|    Thm* ∀P:('a→Type), x:'a.
|         P(x) ⇒ (∀y:'a. P(y) ⇒ x = y) ⇒ (@y:'a. P(y)) = x
|    {choose_unique}
|
1. 'a : S
2. t : 𝔹
3. t1 : 'a
4. t2 : 'a
⊢  if t then t1 else t2 fi
|  =
|  (@x:'a. ((t =_b true₂)⇒₂(x =_b t1)∧₂(t =_b false₂)⇒₂(x =_b t2)))
| by BoolInd 2 THEN Simp THEN StrongAuto
|
|\
| 1. 'a : S
```

```
| 2. t1 : 'a
| 3. t2 : 'a
| ⊢  t1
| |  =
| |  (@x@0:'a. ((true₂ = true₂ ⇒ x@0 = t1) & (False ⇒ x@0 = t2)))
| | by SwapEquands 0
| |    THEN
| |    L
| |    Thm* ∀P:('a→Type), x:'a.
| |         P(x) ⇒ (∀y:'a. P(y) ⇒ x = y) ⇒ (@y:'a. P(y)) = x
| |    {choose_unique}
| |    THEN
| |    Simp
| |    THEN
| |    StrongAuto
| |
| 1. 'a : S
| 2. t1 : 'a
| 3. t2 : 'a
| 4. x@0 : 'a
| 5. true₂ = true₂ ⇒ x@0 = t1
| 6. False ⇒ x@0 = t2
| ⊢  t1 = x@0  by Analyze 5 THEN Simp THEN StrongAuto
|
.\
. 1. 'a : S
. 2. t1 : 'a
. 3. t2 : 'a
. ⊢  t2 = (@x:'a. ((False ⇒ x = t1) & (false₂ = false₂ ⇒ x = t2)))
. | by SwapEquands 0
. |    THEN
. |    L
. |    Thm* ∀P:('a→Type), x:'a.
. |         P(x) ⇒ (∀y:'a. P(y) ⇒ x = y) ⇒ (@y:'a. P(y)) = x
. |    {choose_unique}
. |    THEN
. |    Simp
. |    THEN
. |    StrongAuto
. |
. 1. 'a : S
. 2. t1 : 'a
. 3. t2 : 'a
. 4. x : 'a
. 5. False ⇒ x = t1
. 6. false₂ = false₂ ⇒ x = t2
. ⊢  t2 = x  by Analyze -1 THEN Simp THEN StrongAuto

END
```