```
reach_list  THM

⊢  ∀Auto:Automata(Alph;St).
|  Fin(St) & Fin(Alph) ⇒
|  (∃RL:St*. ∀s:St. (∃w:Alph*. (Result(Auto)w) = s) ⟺ mem_f(St;s;RL))
| by RepD
|
1. Alph : Type
2. St : Type
3. Auto : Automata(Alph;St)
4. Fin(St)
5. Fin(Alph)
⊢  ∃RL:St*. ∀s:St. (∃w:Alph*. (Result(Auto)w) = s) ⟺ mem_f(St;s;RL)
| by Inst
|     Thm* ∀S:ActionSet(Alph), si:S.car.
|          Fin(S.car) ⇒
|          Fin(Alph) ⇒
|          (∃RL:S.car*.
|           ∀s:S.car. (∃w:Alph*. (S:w←si) = s) ⟺ mem_f(S.car;s;RL))
|     {reach_aux}
|     [Alph;<St,λa:Alph. λs:St. δAuto(s,a)>;InitialState(Auto)]
|
|\
| .....wf .....
| ⊢  <St,λa:Alph. λs:St. δAuto(s,a)> ∈ ActionSet(Alph)
|   by Unfold `action_set` 0
|
|\
| .....implicit subterm .....
| ⊢  <St,λa:Alph. λs:St. δAuto(s,a)>.car ∈ Type
|   by Unfold `aset_car` 0
|
|\
| .....antecedent .....
| ⊢  Fin(<St,λa:Alph. λs:St. δAuto(s,a)>.car)
|   by Unfold `aset_car` 0 THEN Reduce 0 THEN NthHyp -2
|
.\
. 6. ∃RL:<St,λa:Alph. λs:St. δAuto(s,a)>.car*.
. |  ∀s:<St,λa:Alph. λs:St. δAuto(s,a)>.car.
. |  (∃w:Alph*.
. |   (<St,λa:Alph. λs:St. δAuto(s,a)>:w←InitialState(Auto)) = s)
. |  ⟺
. |  mem_f(<St,λa:Alph. λs:St. δAuto(s,a)>.car;s;RL)
. ⊢   by Unfold `aset_car` -1 THEN Reduce -1
. |
. 6. ∃RL:St*.
.    ∀s:St.
.    (∃w:Alph*.
.     (<St,λa:Alph. λs:St. δAuto(s,a)>:w←InitialState(Auto)) = s)
.    ⟺
.    mem_f(St;s;RL)
. ⊢
.   by RWH
.      (LemmaC
```

```
.        Thm* ∀Auto:Automata(Alph;St), l:Alph*.
.             (<St,λl,s. δAuto(s,l)>:l←InitialState(Auto))
.             =
.             (Result(Auto)l)
.        {action_auto})
.       -1
END
```