```
prime_or_smaller_prime_factor2  THM

⊢  ∀x:{2...}. ∃p:{2...}, c:{1...}. p≤x & prime(p) & x = p•c  by Auto𝕀
|
1. x : {2...}
⊢  ∃p:{2...}, c:{1...}. p≤x & prime(p) & x = p•c
| by Decide: prime(x) ...w𝕀
|
|\
| 2. prime(x)
| ⊢  ∃p:{2...}, c:{1...}. p≤x & prime(p) & x = p•c
| | by Witness: x ...𝕀
| |
| ⊢  ∃c:{1...}. x≤x & prime(x) & x = x•c  by Witness: 1 ...𝕀
|
.\
. 2. ¬prime(x)
. ⊢  ∃p:{2...}, c:{1...}. p≤x & prime(p) & x = p•c
. | by FwdThru:
. |    Thm*  ∀x:{2...}.
. |          ¬prime(x) ⇒ (∃i,j:{2..x⁻}. x = i•j & prime(i))
. |    {composite_with_prime_factor}
. |    on [ ¬prime(x) ] ...𝕀
. |
. 3. ∃i,j:{2..x⁻}. x = i•j & prime(i)
. ⊢  ∃p:{2...}, c:{1...}. p≤x & prime(p) & x = p•c  by ExistHD Hyp:-1
. |
. 3. i : {2..x⁻}
. 4. j : {2..x⁻}
. 5. x = i•j
. 6. prime(i)
. ⊢  ∃p:{2...}, c:{1...}. p≤x & prime(p) & x = p•c
. | by Witness: i ...𝕀
. |
. ⊢  ∃c:{1...}. i≤x & prime(i) & x = i•c  by Witness: j ...𝕀
END
```