6500B User Manual Addendum

Chapter 11 – Remote Control

Introduction

Version 2.213 of the 6500B firmware introduces some new remote control commands associated with Short Circuit and Open Circuit Trims and HF Compensation.

New Commands

Command	Description
*STATUS?	Query the status of the trim or HF Compensation routine
*CAL-ABORT	Abort the current trim or HF Compensation routine
*CAL-CONTINUE	Continue the HF Compensation routine after the transfer standard component has been changed
:CAL:HF-COMP	Start the HF Compensation routine
:CAL:STORE-TRIMS	Store user trims
:CAL:CLEAR-TRIMS	Clear user trims
:CAL:STORE-HF-COMP	Store user HF Compensation values
:CAL:CLEAR-HF-COMP	Clear user HF Compensation values

***Status? bit definition**

Bit	Description
0	Trim or HF Comp in progress.
1	Fit 100R Transfer Standard.
2	Fit 100pF Transfer Standard.
3	Fit 10pF Transfer Standard.
4	Not used.
5	Not used.
6	Trim complete with warning.
7	Trim complete but failed.

All bits set to 0: Trim or HF Comp complete with no errors or warnings

Detail

1. Open Circuit Trim & Short Circuit Trim

Earlier versions of 6500B firmware (2.211 and lower) did not allow the use of any remote control functions from the time a **:CAL:OC-TRIM** or a :**CAL:SC-TRIM** command was issued until the time the trim was complete.

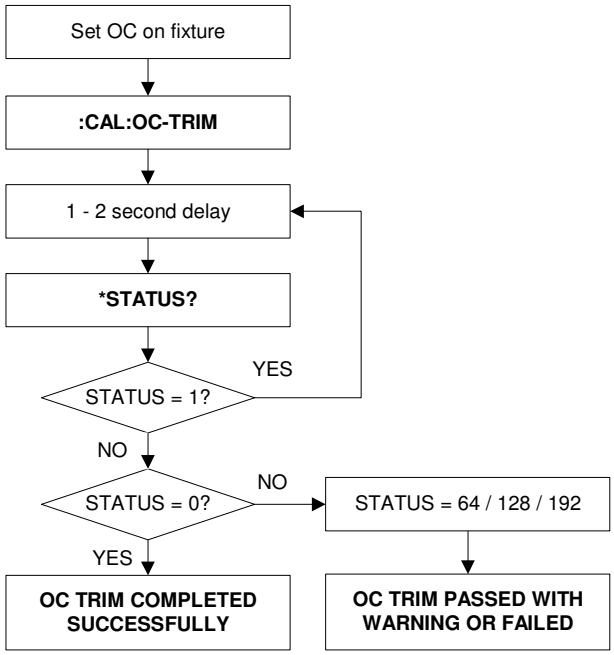
In this new version of firmware, other remote control commands can be issued almost immediately after trim commands are issued, but only ***STATUS?**, ***CAL-ABORT** and ***CAL-CONTINUE** will be executed during an OC or SC trim.

The new ***STATUS?** command can be issued at any time after a **:CAL:OC-TRIM** or a **:CAL:SC-TRIM** and is used to query the progress of the trim

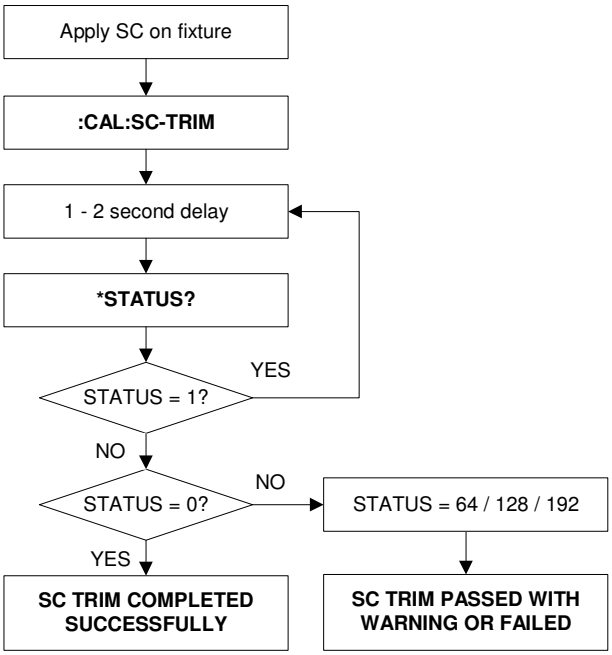
> ***STATUS?** = 1 (0000 0001 or 0X01) means trim in progress
>
> ***STATUS?** = 0 (0000 0000 or 0X00) means trim complete with no errors or warnings
>
> ***STATUS?** = 64 (0100 0000 or 0X40) means trim complete with warning (Impedance Too High or Impedance Too Low depending on the type of trim)
>
> ***STATUS?** = 128 (1000 0000 or 0X80) means trim complete but failed (most likely due to the trim being aborted)

The new ***CAL-ABORT** command can be issued at any time, but will only function while Open Circuit or Short Circuit Trims are in progress and will cause the process to terminate early. This command should work almost immediately.

Suggested Implementation for OC Trim:



Suggested Implementation for SC Trim:



2. HF Compensation Routine

The new **:CAL:HF-COMP** command initiates the HF Compensation routine. This routine requires user intervention to fit the different transfer standard components at the appropriate times.

The ***STATUS?** command can be used during this routine to determine when each component should be fitted to the 6500B.

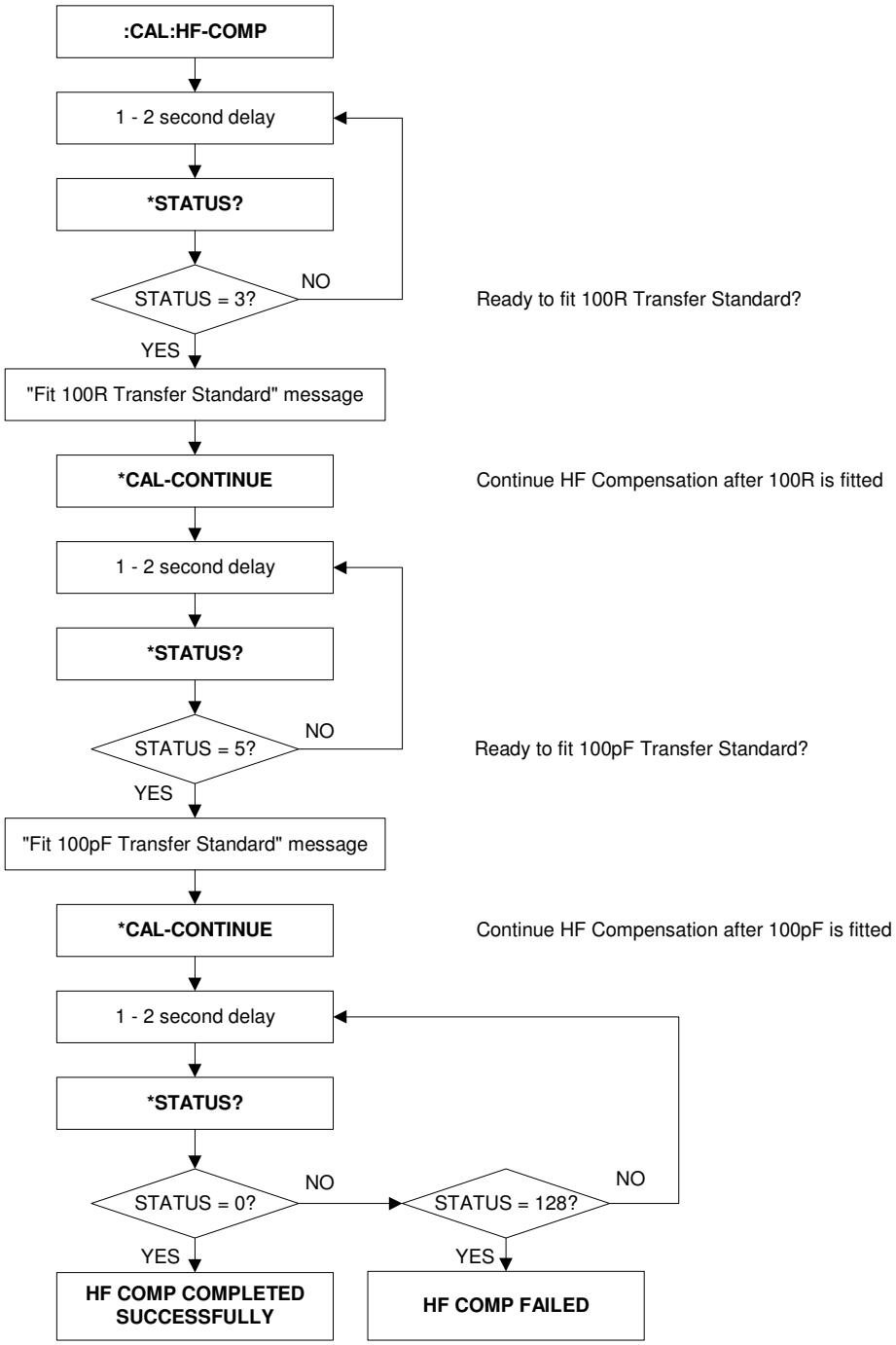
> ***STATUS?** = 1 (0000 0001 or 0X01) means HF Comp in progress
>
> ***STATUS?** = 3 (0000 0011 or 0X03) means HF Comp in progress - fit 100R transfer standard
>
> ***STATUS?** = 5 (0000 0101 or 0X05) means HF Comp in progress - fit 100pF transfer standard
>
> ***STATUS?** = 9 (0000 1001 or 0X09) means HF Comp in progress - fit 10pF transfer standard (not required on 6505B, 6510B or 6515B)
>
> ***STATUS?** = 0 (0000 0000 or 0X00) means HF Comp complete with no errors
>
> ***STATUS?** = 128 (1000 0000 or 0X80) means HF Comp complete but failed (most likely due to the routine being aborted

The new ***CAL-CONTINUE** command is issued to continue with the HF Compensation routine after the required transfer standard component has been fitted to the fixture.

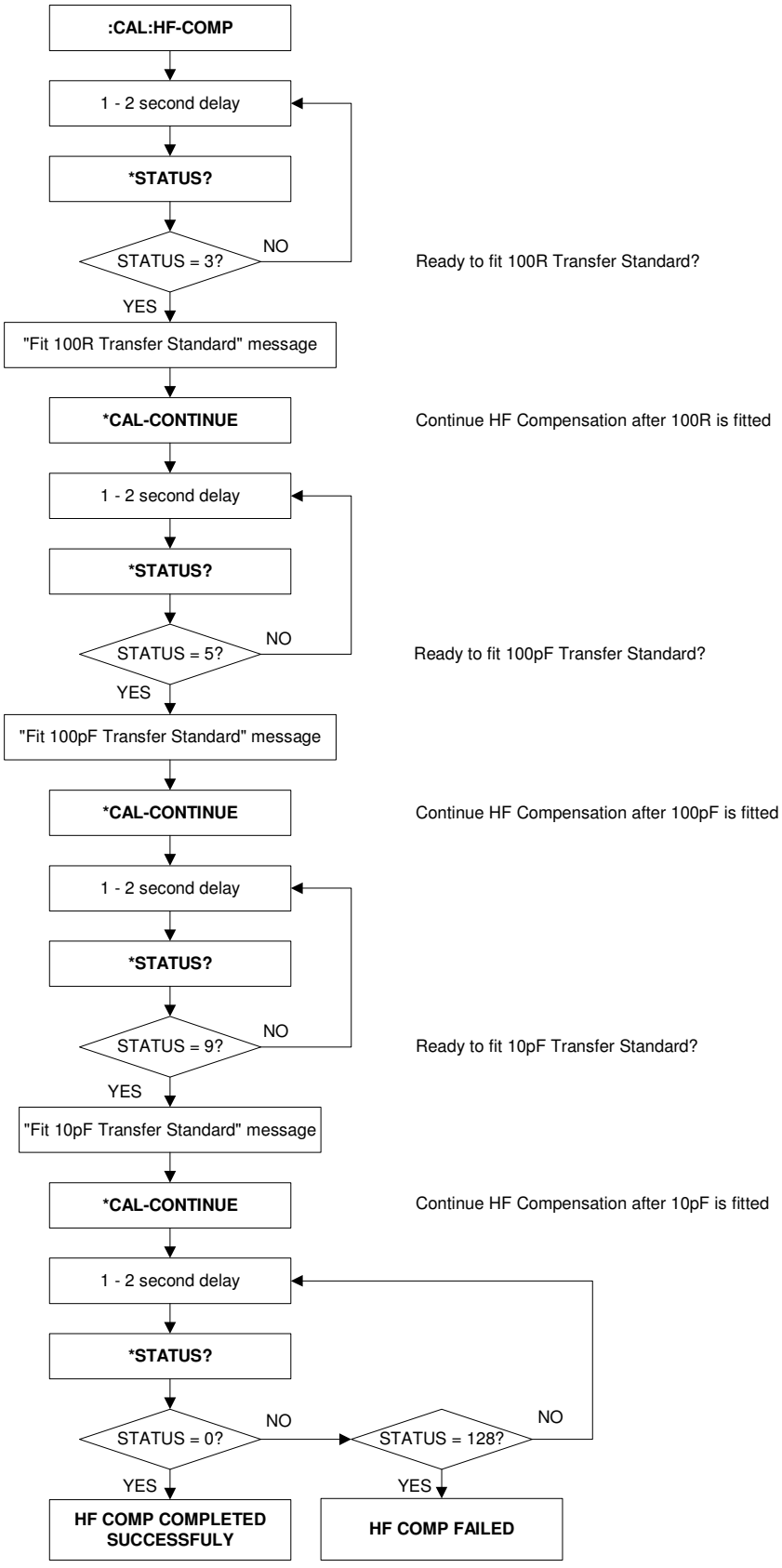
If a transfer standard component is not connected within 2 minutes of the relevant flag being set and a ***CAL-CONTINUE** command is not issued, the HF Compensation routine will abort.

The new ***CAL-ABORT** command can be issued at any time, but will only function while the HF Compensation routine is in progress and will cause the routine to terminate early. There may be a short delay before this command is implemented, depending on which stage the HF Compensation routine is at.

Suggested Implementation for 6505B, 6510B and 6515B. 10pF transfer standard not used.



Suggested Implementation for 6520B, 6530B, 6550B and 65120B:



APPENDIX A
REMOTE CONTROL COMMANDS FOR VERSION 2.213

Common Commands

Status

*STATUS?

Query the status of the trim or HF Compensation which is either currently underway (or which was the last performed if no trim or HF Compensation is underway).

Parameter

None.

Response

The status.

The following statuses are used during or after short circuit and open circuit trims.

0	Trim complete with no errors or warnings.
1	Trim in progress.
64	Trim complete with warning. Warning is 'Impedance Too High' (for short circuit trim) or 'Impedance Too Low' (for open circuit trim).
128	Trim complete but failed. The most likely reason for the failure is the Abort button on the display being pressed.

The following statuses are used during or after HF Compensation.

0	HF Compensation complete with no errors or warnings.
1	HF Compensation in progress.
3	HF Compensation routine in progress – user should fit 100R transfer standard.
5	HF Compensation routine in progress – user should fit 100pF transfer standard.
9	HF Compensation routine in progress – user should fit 10pF transfer standard
128	HF Compensation complete but failed. The most likely reason for the failure is the Abort button on the display being pressed.

Note

The 10pF transfer standard is not used on the 6505B, 6510B and 6515B models.

Common Commands

Abort

*CAL-ABORT

Abort the trim or HF Compensation which is in progress.

Parameter

None.

Response

None.

Continue

*CAL-CONTINUE

Continue the HF Compensation routine after a transfer standard component has been changed.

Parameter

None.

Response

None.

Calibrate (:CAL)

Open Circuit Trim

:OC-TRIM

Perform an open circuit trim.

Parameter

None.

Response

The open circuit trim result.

1	Trim passed.
0	Trim failed.

:OC-TRIM?

Query the open circuit trim status.

Parameter

None.

Response

The open circuit trim status.

1	Trim valid.
0	Trim invalid.

Short Circuit Trim

:SC-TRIM

Perform a short circuit trim.

Parameter

None.

Response

The short circuit trim result.

1	Trim passed.
0	Trim failed.

:SC-TRIM?

Query the short circuit trim status.

Parameter

None.

Response

The short circuit trim status.

1	Trim valid.
0	Trim invalid.

HF Compensation

:HF-COMP

Start the HF Compensation routine.

Parameter

None.

Response

None.

Note:

The *STATUS? command should be used to determine what stage of the HF Compensation routine has been reached and when to fit the relevant transfer standard component.

Calibrate (:CAL)

Upper Frequency Limit

:FREQ-LIMIT <real>

Set the upper frequency limit for trims and HF Compensation.

Parameter

Set the value of frequency limit as a real number.

Response

None.

Example

Set 1MHz limit:

```
:CAL:FREQ-LIMIT 1E6
```

Note:

This command is only required when an upper limit which is not the instrument's maximum frequency is required.

:FREQ-LIMIT?

Query the upper frequency limit for trims and HF Compensation.

Parameter

None

Response

The value of frequency limit as a real number.

Example

```
1E6
```

when limit is set to 1MHz.

User SC & OC Trims

:STORE-TRIMS

Store user short circuit and open circuit trim values.

Parameter

None.

Response

None.

:CLEAR-TRIMS

Clear user short circuit and open circuit trim values.

Parameter

None.

Response

None.

Calibrate (:CAL)

User HF Compensation

:STORE-HF-COMP

Store user HF Compensation values.

Parameter

None.

Response

None.

:CLEAR-HF-COMP

Clear user HF Compensation values.

Parameter

None.

Response

None.