

This guide is updated to reflect the software from NavCom which is related to the StarFire satellite and frequency changes. The most recent version of software for both current and legacy NavCom products are as follows:

Discontinued Products			Current Products		
Dual Frequency – NCT-2000D Based Products including the NCT-2030, RT-3010, RT-3020, SF-2040, and SF-2050	Dual Frequency – NCT-2100D Based Products including the NCT-2030, RT-3010, RT-3020, SF-2040, and SF-2050	Single Frequency – SF-2110 Family Products	Multi-Frequency – SF-3050 / Sapphire Family Products	Multi-Frequency – SF-3040	
Update Firmware to the	following versions:				
SLv3,3,2.Bin LBMv3,10.hex	SLv5,1,18.Bin LBMv3,10.hex	SF-2110_v2_2_12.s19	SP_UFL_v3.5.x.x.s19 StarUtil3000_V1.2.30	SP_UFL_v3.5.x.x.s19 StarUtil3000_V1.2.30	

Please contact your NavCom Dealer or <u>NavCom Customer Support</u> to obtain a copy of the latest software. As always, a copy of the software release notice is available on NavCom's <u>Support</u> website.

This guide will step you through retuning the StarFire<sup>™</sup> receiver to track changed satellite assignments for the StarFire Network via NavCom's StarUtil program.

## Problem -

- FCC National Broadband Plan asks for more mobile broadband
- The FCC is looking to repurpose underutilized L-band satellite spectrum both above and below the GNSS L1 band
- Moving StarFire<sup>™</sup> to a higher L-band frequency to make designing robust filtering less challenging
- **Resolution** Update the receiver to the current release, as defined in the table above. Current products updated with the new firmware (version v3.5.x.x) will include an updated StarFire tracking table and an over-the-air StarFire almanac feature which allows for automatic updating of the tracking table should any statellites or almanac feature for frequency changes which might occur in the future. This feature, the added capability of GLONASS in StarFire, the accuracy improvements to <5cm and futher planned improvements (don't ask, we can't tell) are all good reasons to consider upgrading from the discontinued products to the current products. The new software table was increased to handle up to 20 StarFire satellites.

Software for discontinued products does not contain an updated StarFire tracking table.

Follow the directions below to manually tune a discontinued receiver to the new frequency.

There are two phases of StarFire frequency changes. Net 2 StarFire frequencies were changed on November 1, 2014. Net 1 StarFire frequency changes will take effect June 12, 2015.

Graphical representation of the new global footprint is provided <u>at the end</u> of this document.



	С	ld		New			Start Date	Stop Date		
Satellite	ID	Net	Frequency (KHz)	Satellite	ID	Net	Frequency (KHz)	Satellite	New Service on-air	Old service discontinued
54W	446	2	1,539,842.5	54W	446	2	1,545,977.5	3F4	11/1/2014	12/15/2014
15.5W	484	2	1,539,852.5	15.5W	484	2	1,545,987.5	3F3	11/1/2014	12/15/2014
64E	564	2	1,539,872.5	64E	564	2	1,545,967.5	4F1	11/1/2014	12/15/2014
178E	678	2	1,539,862.5	178E	678	2	1,545,987.5	4F3	11/1/2014	12/15/2014
98W	402	1	1,539,892.5	98W	402	1	1,545,967.5	PAC-E	06/12/2015	07/15/2015
25E	525	1	1,539,872.5	25E	525	1	1,545,885.0	IND-W	06/12/2015	07/15/2015
143.5E	643	1	1,539,862.5	143.5E	643	1	1,545,977.5	PAC-W	06/12/2015	07/15/2015

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iable	1. Salei	iile Assigiii		iel z anu i	VELIV	Jilaliye

As seen from the Start date column, all new StarFire are currently broadcasting on the new satellite / frequency combination. The Stop date is the date StarFire will stop broadcasting the current satellite / frequency combination. During the time between the start and stop dates both the new and old frequencies/satellites will be active.

The table below provides a quick overview of affected products and a brief summary of the impact to the receiver model by software version number. The table is divided into 2-categories: 3-Satellite StarFire constellation base for those customers who have not updated software recently and 6-Satellite StarFire constellation base for those customers who have updated software recently.

Product	3-Satellite Network Software Versions	Impact	6-Satellite Network Software Versions	Impact	New Software Versions
NCT-2000D	No StarFire Module	None	No StarFire Module	None	None
NCT-2100D	No StarFire Module	None	No StarFire Module	None	None
NCT-2030(M)	No StarFire Module	None	No StarFire Module	None	None
RT-3010S	No StarFire Module	None	No StarFire Module	None	None
RT-3020S	No StarFire Module	None	No StarFire Module	None	None
SF-2040G	GPS v3.1.17 and earlier <u>LBM v1.5</u> and earlier	Manual tuning of Channel ID;	GPS v3.2.9 to v5.1.13 LBM v3.0 and later	Monual tuning	GPS v3.2.12 and v5.1.18 with LBM v3.10 and later
SF-2050G/M/R	GPS v3.1.17 and earlier <u>LBM v1.5</u> and earlier	No auto- transistion globally	GPS v3.2.9 to v5.1.13 LBM v3.0 and later	of frequency to acquire globally  No auto- transition	GPS v3.2.12 and v5.1.18 with LBM v3.10 and later
SF-2110	Not Applicable	None	<u>v1.5.71 or 2.2.8</u>	globally between regions	v2.2.12 and later
Sapphire	Not Applicable	None	<u>v2.2.9.0</u>	regions	
SF-3050	Not Applicable	None	<u>v2.2.9.0</u>		v3.5.XX and later
SF-3040	Not Applicable	None	<u>v2.1.7.0</u>		

## Table 2: Model Impact on Old Firmware

Based on the table above, identify the software in your unit and refer to the appropriate section below.



## LBM v1.5 Instructions

Please follow the procedure below to manually tune the StarFire receiver to the new frequency. *This instruction applies to LBM v1.5 and earlier.* 

This instruction assumes that the receiver is currently licensed for and tracking StarFire satellite signals. If after completing this instruction, the receiver is not tracking StarFire signals, please refer to the <u>StarFire</u> <u>Tracking Troubleshooting Guide</u>.

 $\checkmark$  View  $\rightarrow$  AE – Version Information

Messages   Naks   Input	AE - Version Information
	Versions
	Navigation software: 4.2.12
	Bootblock software: BootBlockV 0.040
	Build identifier: NCT 080130.1525
	IOP software: 3.0.0 PIC 8
	IOP Build Identifier: DAT060810.1559
	Serial Numbers
	Digital card serial number: 40010 3
	RF card serial number: 41185 0
	Receiver type: BlackBox RTK
	Last: 02/26/2008 17:13:03
	Retrieve

 $\checkmark$  View  $\rightarrow$  D0-LBM Identification Block

Versions	
LBM software: 2.9	
Bootblock software: Version 0.3.0.0	
Build identifier: xxx 080129.1904	
Serial Numbers	
Serial Number: 137	
Hardware Configuration: 3002	
Communication ID:  0	
Last: 02/28/2008 10:39:31	



- ✓ Select Receiver → Messages → NCT output from the menu bar. The NCT Binary Messages window opens.
  - Ensure that these default messages are scheduled for output:
    - 86 On Change
    - A0 On Change
    - AE Every 600 Seconds
    - B1 On Change
  - Schedule this message for output:
    - 30 On Change
- ✓ Schedule messages for output that are pertinent to the StarFire L-Band Module (LBM).
  - Select Receiver → Setup → StarFire → Configure Message Output. The LBM Messages window opens.
  - o Schedule these messages for output:
    - D0 Every 600 Seconds
    - D1 Every 600 Seconds
    - D2 On Change
    - D3 On Change
    - D5 On Change

Message ID	Port	Rate
44	Control	On change
81	Control	On change
86	Control	On change
A0	Control	On change
AE	Control	Every 600 seconds
B0	Control	On change
B1	Control	On change
Turn off all other r Turn off all other r	messages on all ports messages on only this	Radio Unit Id: 0



#### $\checkmark$ View $\rightarrow$ D3



o LBM Software v1.5 or Earlier and GPS Software Version 3.1.17 or Earlier

🔅 D3 - LBM DSP Status		
Last 09/24/2009 07:47:47		<u>R</u> etrieve
41080 SF channel number	2     Authorization status       No     Use alternate channel	
1678.6 Tracked baseband freq 8.9107 SF signal C/N0		

- LBM DSP Status
- Check StarFire signal C/No Value which should be above 0dB (>9dB is typical at NavCom's office in Southern California)

The C/No value varies based on the distance between the StarFire satellite and the receiver.

- ✓ Set the Alternate Satellite
  - $\circ$  Select Receiver  $\rightarrow$  Setup  $\rightarrow$  StarFire  $\rightarrow$  Alternate Channel

🗰 NCT GPS	Receiver Utilit	y		
File PC Port	Receiver View	Tools H	Help	
8	Messages	+ I	🐨 🖌 🛞 🛛 😨	
Messages N	Setup		Rover / Tracking and navigation	
	Commands	• 👰	Vertical Antenna Bias	
			Initial position	
		RASE	Base	
			StarFire 🕨	Quick Start
		Z	Ports	Alternate Channel
			PPS and event latch	Configure Message Output
			Select Ack/Nak Response Ports	
			Select WAAS Prns	
			Internal Radio	
			External Radio	
		_		

• Set the Alternate Channel to based on the Table 3 below

			<u>.</u>	- ((4))	
Location	Net	Satellite ID	Channel No	Frequency (KHz)	New Service on-air
54W	2	446	41955	1,545,977.5	11/1/2014
15.5W	2	484	41975	1,545,987.5	11/1/2014
64E	2	564	41935	1,545,967.5	11/1/2014
178E	2	678	41975	1,545,987.5	11/1/2014
98W	1	402	41935	1,545,967.5	06/12/2015
25E	1	525	41770	1,545,885.0	06/12/2015
143.5E	1	643	41955	1,545,977.5	06/12/2015

Table 3: Satellite ID's and Channel No's for New Satellites



- Check Use Alternate Channel
- Check Ack/Nak

🔹 LBM Alternate Channel 📃 🗖 🔀	🔹 LBM Alternate Channel	
Control Use Alternate Channel Alternate Channel Alternate Channel: Alternate Channel Alternate C	 Control ✓ Use Alternate Channel Alternate Channel: 24905 ✓ Ack/Nak ✓ Use Defaults <u>DK</u> Cancel Apply Last: Never	<u>R</u> etrieve

- Click OK
- $\checkmark$  View  $\rightarrow$  D3
  - o After a few minutes, the receiver should be tracking the new StarFire Satellite

🌾 D3 - LBM DSP Status		
Last: 09/24/2009 07:49:47		<u>R</u> etrieve
24905 SF channel number	2 Authorization status Yes Use alternate channel	
Tracked baseband freq           8.9787         SF signal C/N0		

- LBM DSP Status
- Check SF Channel Number (see Table 3 above)
- Check StarFire signal C/No Value which should be above 0dB (>9dB is typical at NavCom's office in Southern California)

If the receiver is moved from one StarFire region to another, the receiver will not automaticly tune to the new receiver frequency. When this occurs, repeat the initial steps with the appropriate new Channel ID.



- $\checkmark \quad View \rightarrow B1 Solution$ 
  - o dGPS mode: 11 RTG Dual

NCT GPS Receiver	Utility 📃 🔲 🔀 🔪
File PC Port Receiver	View Tools Help
Messages   Naks   Inpu	30 - Software Options         44 - Almanac Health         5B - RTK Corrections         5C - Base Station         5D - RTG RTK Offset Vector         84 - PPS Data         86 - Channel Status, E1 - Satellite Failure Details         A0 - Alerts         AE - Version Information         50 - Raw Measurements
Merit. Receiver Port: Port 1: 192 PC Port: COM76 : 11520	<ul> <li>B1 - Solution Plot</li> <li>B1 - Solution</li> <li>B2 - Satelite S</li> <li>B2 - Satelite S</li> <li>B4 - Event Lat</li> <li>D0 - LBM Ldem</li> <li>D1 - LBM Licen</li> <li>D3 - LBM DSP</li> <li>D4 - Left Lat</li> <li>D5 - LBM Licen</li> <li>E1 - Meas Qua</li> <li>E1 - Meas Qua</li> <li>E2 - SC delta t</li> <li>Height 8.8906 (ellipsoidal)</li> <li>East 0.00 (m/s) GDOP: 2.7</li> <li>EASt 0.000 (vertical antenna bias)</li> <li>Ground track: 165.9 (deg N) TOOP: 1.0</li> <li>Adjustment 0.0000 (vertical antenna bias)</li> <li>Ground track: 165.9 (deg N) TOOP: 1.3</li> <li>Nav valid Yes</li> <li>PPS valid Yes</li> <li>Data Yes</li> <li>Adjust vertical (height) No</li> <li>SET North: 0 (mm)</li> <li>Rast 0 (mm)</li> <li>Rt K zktend Active: No</li> <li>East 0 (mm)</li> <li>East 0 (mm)</li> <li>Rt K zktend Active: No</li> <li>East 0 (mm)</li> <li>East 0 (mm)</li> <li>BTK Extend Active: No</li> <li>East 0 (mm)</li> </ul>



### LBM v3.0 and later

Please follow the procedure below to manually tune the StarFire receiver to the new frequency. *This instruction applies to LBM v3.0 and later.* 

This instruction assumes that the receiver is currently licensed for and tracking StarFire satellite signals. If after completing this instruction, the receiver is not tracking StarFire signals, please refer to the <u>StarFire</u> <u>Tracking Troubleshooting Guide</u>.

 $\checkmark$  View  $\rightarrow$  AE – Version Information

Messages Naks   Input	AE - Version Information
	Versions
	Navigation software: 4.2.12
	Bootblock software: BootBlockV 0.040
	Build identifier: NCT 080130.1525
	IOP software: 3.0.0 PIC 8
	IOP Build Identifier: DAT060810.1559
	Serial Numbers
	Digital card serial number: 40010
	RF card serial number: 41185 0
	Receiver type: BlackBox RTK
	Last: 02/26/2008 17:13:03
	<u></u> etieve

 $\checkmark$  View  $\rightarrow$  D0-LBM Identification Block

Messages   Naks   Inp	Jut D0 - LBM Identification Block
	Versions
	LBM software: 2.9
	Bootblock software: Version 0.3.0.0
	Build identifier: xxx 080129.1904
	Serial Numbers
	Serial Number: 137
	Hardware Configuration: 3002
	Communication ID: U
	Last: 02/28/2008 10:39:31
	[ <u>B</u> etrieve



- ✓ Select Receiver → Messages → NCT output from the menu bar. The NCT Binary Messages window opens.
  - Ensure that these default messages are scheduled for output:
    - 86 On Change
    - A0 On Change
    - AE Every 600 Seconds
    - B1 On Change
  - Schedule this message for output:
    - 30 On Change
- ✓ Schedule messages for output that are pertinent to the StarFire L-Band Module (LBM).
  - Select Receiver → Setup → StarFire → Configure Message Output. The LBM Messages window opens.
  - Schedule these messages for output:
    - D0 Every 600 Seconds
    - D1 Every 600 Seconds
    - D2 On Change
    - D3 On Change
    - D5 On Change
    - DB Every 600 Seconds
    - DD Every 600 Seconds

Message ID	Port	Rate
44	Control	On change
81	Control	On change
86	Control	On change
AO	Control	On change
AE	Control	Every 600 seconds
B0	Control	On change
B1	Control	On change
Turn off all other ✓ Turn off all other	messages on all ports messages on only this	Radio Unit Id: 0
		Clear Betriev

File       PC Port       Receiver       View       Tools       Help         Messages       Messages				
StarFire	Quick Start Alternate StarFire Satellite			
PPS and event latch	Configure Message Output	LBM Messages		
Select Ack/Nak Response Ports	Define Satellite	Message Type	Rate	<u>~</u>
Select WAAS Prns Internal Radio External Radio RTK		5F 60 A0 D0 D1 D2 D2 D2	On change Every 5 seconds On change Every 600 seconds Every 600 seconds On change	
		D5 DB DD IV Turn off all other messa	On change     Every 600 seconds     Every 600 seconds ages on this port     Cancel     Annly	<u>R</u> etrieve



- $\checkmark$  View  $\rightarrow$  D3
- ✓ LBM Software v3.0 or Later and GPS Software Version 3.2.9 or Later.

Messages Naks Input D3 - LBM DSP Sta	atus	
Last 02/28/2008 10:43:23		<u>R</u> etrieve
525 SF satellite id	2     Authorization status       No     Use alternate satellite	
-853.656 Tracked baseband freq 8.3024 SF signal C/N0		

- LBM DSP Status
- Check StarFire signal C/No Value which should be above 0dB (>9dB is typical at NavCom's office in Southern California)

The C/No value varies based on the distance between the StarFire satellite and the receiver.

- ✓ Define Satellite
  - $\circ \quad \text{Select } \textit{Receiver} \rightarrow \textit{Setup} \rightarrow \textit{StarFire} \rightarrow \textit{Define Satellite}$

🔻 StarUtil-	2100			
File PC Port	Receiver View	Tools I	Help	
8	Messages	- F	🐨 🖌 🎯 🛛 😨	
Messages N	Setup	NOVER	Rover / Tracking and navigation	
	Commands	• 👰	Vertical Antenna Bias	
			Initial position	
			Base	
			StarFire 🕨	Quick Start
		Į	Ports	Alternate StarFire Satellite
			PPS and event latch	Configure Message Output
			Select Ack/Nak Response Ports	Define Satellite
			Select WAAS Prns	

- Check Enter User-Defined Satellite
- Set the *Frequency(KHz)* to *Satellite ID* per Table 3 for the appropriate area of operation
- o Check Ack/Nak



🔹 Define Satellite	C Define Satellite	
User-Defined Satellite T Enter User-Defined Satellite Frequency(KHz): 0 Satellite ID: 0	User-Defined Satellite           Image: Statellite         Image: Statellite           Image: Statellite         Frequency(KHz):           1537452.5         Satellite ID:	
Delete User-Defined Satellite	🖵 Delete User-Defined Satellite	
C Ack/Nak Retrieve		Retrieve
OK Cancel Apply	OK Cancel	Apply

- o Click OK
- ✓ Set the Alternate Satellite
  - $\circ \quad \text{Select } \textit{Receiver} \rightarrow \textit{Setup} \rightarrow \textit{StarFire} \rightarrow \textit{Alternate Channel}$

🗰 NCT GPS	Receiver Utilit	y		
File PC Port	Receiver View	Tools I	Help	
8	Messages	+		
Messages N	Setup	NOVER	Rover / Tracking and navigation	
	Commands	• 🧕	Vertical Antenna Bias	
			Initial position	
		BASE	Base	
			StarFire >	Quick Start
		Z	Ports	Alternate Channel
			PPS and event latch	Configure Message Output
			Select Ack/Nak Response Ports	
			Select WAAS Prns	
			Internal Radio	
			External Radio	
				,

- o Set the Alternate Channel to the appropriate Satellite ID in Table 4 above
- Check Use Alternate Channel
- o Check Ack/Nak

🗴 StarFire Satellite ID	🔹 StarFire Satellite ID
Control	Control
Use Alternate Satellite	↓ Use Alternate Satellite
Alternate Satellite ID:	Alternate Satellite ID: 526
☐ Ack/Nak ☐ Use Defaults	Use Defaults
<u>QK</u> <u>Cancel</u> <u>Apply</u>	<u>Q</u> K <u>Cancel</u> <u>Apply</u>
Last: Never	Last: Never



- Click OK
- $\checkmark$  View  $\rightarrow$  D3
  - $\circ$   $\;$  After a few minutes, the receiver should be tracking the new StarFire Satellite

Messages Naks Input D3 - LBM DSP Sta	tus	
Last 02/28/2008 10:46:23		
526 SF satellite id	Authorization status       Yes       Use alternate satellite	
-856.256 Tracked baseband freq		
J8.3024 SF signal C/NU		

- LBM DSP Status
- Check SF Channel ID (refer Table 3 for the appropriate channel ID per area of operation)
- Check StarFire signal C/No Value which should be above 0dB (>9dB is typical at NavCom's office in Southern California)

If the receiver is moved from one StarFire region to another, the receiver will not automaticly tune to the new receiver frequency. When this occurs, repeat the initial steps with the appropriate new frequency and ID.



- $\checkmark$  View  $\rightarrow$  B1 Solution
  - o dGPS mode: 11 RTG Dual

• NCT GPS Receive	Utility
File PC Port Receiver	View Tools Help
Messages Naks   Inpi	<ul> <li>30 - Software Options</li> <li>44 - Almanac Health</li> <li>5B - RTK Corrections</li> <li>5C - Base Station</li> <li>5D - RTG RTK Offset Vector</li> <li>84 - PPS Data</li> <li>86 - Channel Status, E1 - Satellite Failure Details</li> <li>A0 - Alerts</li> <li>AE - Version Information</li> </ul>
Merit Receiver Port: Port 1: 19 PC Port: COM76 : 11520	B0 - Raw Measurements B1 - Solution Plot  B2 - Satellite 5 B2 - Satellite 5 B4 - Event Lata D0 - LBM Ident D1 - LBM Licen D3 - LBM D2F E1 - Messages Naks Input 30 - Software Options B1 - Solution Plot B1 - Solution D1 - LBM Licen D3 - LBM D2F D5 - LBM Licen E1 - Meas Qua EC - SC delta t ED - RTK Wate Aditude: 43.5517 (MSL) Meters View Tools meters (ellipsoidal) East 0.00 (m/s) HDOP: 2.7 Adjustment: 0.0000 (vertical antenna bias) Ground track: 165.9 (deg N) Nav mode: RCP Nav valid: Yes Nav walid: Yes Nav mode: RCP Nav mature
	PPS valid:       Yes       dbPS mode:       11: RTG Dual         Clock stable:       Yes       One sigma error estimate:       0.41 (meters)         Dual freq:       Yes       Adjust vertical (height):       No         SET North:       0       (mm)       RTK Extend Active:       No         East:       0       (mm)       Up:       0       (mm)         Up:       0       (mm)       Up:       Input : None         PC Port:       COM76 : 115200 : Oper       Connected       Auto Baud       Logging: none



### SF-2110 – All versions

Please follow the procedure below to manually tune the StarFire receiver to the new frequency for the satellite located at 25.5° East. This instruction applies to SF-2110, all versions.

This instruction assumes that the receiver is currently licensed for and tracking StarFire satellite signals. If after completing this instruction, the receiver is not tracking StarFire signals, please refer to the <u>StarFire</u> <u>Tracking Troubleshooting Guide</u>.

 $\checkmark$  View  $\rightarrow$  AE – Version Information

🔅 StarUtil-2110	
File PC Port Receiver Vie	w Tools Help
Messages   Naks   Input	AL - Version Information
	Versions
	Navigation software: 1.5.71
	Bootblock software: 1.0.7
	Build identifier: Dec5200718:48:08
	Serial Numbers
	Digital card serial number: 1210 3
	Receiver type:  SF 2110
	Last:  12/07/2007 11:00:16
	<u></u>
Receiver Port: Port A: 57600	(Current Port), Port B: 9600 Input : None
PC Port: COM71 : 57600 : Op	pen Connected Auto Baud Logging: none

- ✓ Select Receiver → Messages → NCT output from the menu bar. The NCT Binary Messages window opens.
  - Ensure that these messages are scheduled for output:
    - 86 On Change
    - A0 On Change
    - AE Every 600 Seconds
    - B1 On Change
    - D1 Every 600 Seconds
    - D3 On Change
    - DB Every 600 Seconds

NCT Binary Me	essages	
Message ID	Port	Rate
44	Control	On change
81	Control	On change
86	Control	On change
A0	Control	On change
AE	Control	Eivery 600 seconds
BO	Control	On change
B1	Control	On change
Turn off all other r	nessages on all ports nessages on only this	Radio Unit Id: 0 port Clear Betrieve
	<u>OK</u> _ancel	



 $\checkmark$  View  $\rightarrow$  D3

Messages Naks Input D3-LBD DSP Status	
Last 09/10/2009 13:33:34	<u>R</u> etrieve
[]	
525 SF Satellite ID	
7.92676 SF signal C/N0	

- LBD DSP Status
- Check StarFire signal C/No Value which should be above 0dB (>9dB is typical at NavCom's office in Southern California)

The C/No value varies based on the distance between the StarFire satellite and the receiver.

- ✓ Define Satellite
  - $\circ$  Select Receiver  $\rightarrow$  Setup  $\rightarrow$  StarFire  $\rightarrow$ Define Satellite

🔻 StarUtil-2110		
File PC Port Receiver View	Tools Help	
Messages	• 😻 🖌 🍈 🗊 😻 📃	
Messages N	Rover / Tracking and navigation	
Commands	<ul> <li>Vertical Antenna Bias</li> </ul>	
	StarFire 🕨	Alternate Channel
	🍠 Ports	Define Satellite
	PPS and event latch	
	Select Ack/Nak Response Ports	
	External Radio	
	Select WAAS Prns	

- o Check Enter User-Defined Satellite
- Set the *Frequency(KHz)* to *Satellite ID* per Table 3 for the appropriate area of operation



🔹 Define Satellite	🔅 Define Satellite
User-Defined Satellite Enter User-Defined Satellite Frequency(KHz): 0 Satellite ID: 0	User-Defined Satellite Enter User-Defined Satellite Frequency(KHz): 1537452.5 Satellite ID: 526
Delete User-Defined Satellite	Delete User-Defined Satellite
OK Cancel	OK Cancel

- Click OK
- ✓ Set the Alternate Satellite
  - $\circ$  Select Receiver  $\rightarrow$  Setup  $\rightarrow$  StarFire  $\rightarrow$  Alternate Channel

🗰 StarUtil-J	2110		
File PC Port	Receiver View	Tools Help	
8	Messages	• 😻 🖌 🍥 🖉 🕲	
Messages   M	Setup	Rover / Tracking and navigation	1
Messages   N	Commands	<ul> <li>Vertical Antenna Bias</li> </ul>	
		StarFire 🕨	Alternate Channel
		🍠 Ports	Define Satellite
		PPS and event latch	

- Set the Alternate Channel to the appropriate Satellite ID in Table 5 above
- Check Use Alternate Channel

🔹 LBD Alternate Channel 📃 🗖 🔀	💌 LBD Alternate Channel 📃 🗖 🔯
Control Use Alternate Satellite Alternate Satellite ID: 0	Control Use Alternate Satellite Alternate Satellite ID: 526
<u></u> Betrieve	<u>R</u> etrieve
<u>D</u> K <u>Cancel</u> <u>Apply</u>	<u> </u>
Last: Never	Last: Never

 $\circ \quad \text{Click } \textit{OK}$ 



- $\checkmark$  View  $\rightarrow$  D3
  - o After a few minutes, the receiver should be tracking the new StarFire Satellite

Messages Naks Input D3 - LBD DSP Status	
Last 09/16/2009 16:36:34	<u>R</u> etrieve
526 SF Satellite ID Yes Use alternate channel	
7.92676 SF signal C/N0	

- LBD DSP Status
- Check SF Satellite ID (refer to Table 3)
- Check StarFire signal C/No Value which should be above 0dB (>9dB is typical at NavCom's office in Southern California)
- If the receiver is moved from one StarFire region to another, the receiver will not automaticly tune to the new receiver frequency. When this occurs, repeat the initial steps with the appropriate new frequency and ID.



- $\checkmark$  View  $\rightarrow$  B1 Solution
  - o dGPS mode: 6 RTG Single





### Sapphire, SF-3040, and SF-3050 – All versions

Please follow the procedure below to manually tune the StarFire receiver to the new frequency. *This instruction applies to Sapphire, SF-3040, and SF-3050 all software versions.* 

This instruction assumes that receiver is currently optioned and licensed for and tracking StarFire satellite signals. If after completing this instruction, the receiver is not tracking StarFire signals, please contact NavCom Customer Support.

✓ Detailed Views  $\rightarrow$  Firmware Info

🏶 StarUtil 3000: COM122	01 044 5/ 04450/ 0444 40 04400				>
File Detailed Views Post Pro	cessing Receiver Setup Toolbar But	ttons Windows Help			
😢 User Guide 📔 Input Term	inal 👩 View/Edit Profile 📑 Data	Logging 💉 Connections 🔅	Preferences		
Corrections: LAT: N 33° 50' 28.2468 LAT: N 33° 50' 28.2468 LON: W 118° 20' 37.20 HT: 8.7760 m	3" Status: (i) StarFire Dual:GNSS Summary: (ii) Nav valid: 3D: Dual	Corrections Age: 2.0 freq 0 (in seconds) 30	Position: 17 PDOP: 1 Velocity: 17 HDOP: 0 Tracked: 17 VDOP: 1	27 77 00 Time in OTC GPS Time: 49555 GPS Week: 1846	51
🐨 Detailed Views	Dashboard StarFire × Receive	er Options ×			
🖄 Position, Velocity, Time	Software Ontions	File Unload			
📓 StarFire	Model: SE-3040				
💼 Channel Status	Serial No: 20031				
Measurements	GPS: L1L2 L2C L5 GLONASS: G1 G2	O Software Options (	CLoad GGM02	O Receiver Firmware	Ipload
🌽 Receiver Options	Galileo: n/a StarEire: Epabled	O StarFire License (	🔾 Geoid Height Map	O Unified File Loader	
Skyplot	Nav: 5Hz			0	
THE NMEA	Data: 5Hz 1PPS/Event Latch: Disabled	StarFire Licenses Primary License:	Seconda	ry License: Point Radius:	9
010 101 View Raw Data	SBAS Corrections: Enabled RTK Base: Enabled	Issue Date: 02/23/2015 16	:56:26 n/a		
🔻 Post Processing	RTK Moving Base: Enabled	Start Date: 02/23/2015	n/a	Latitude:	N 20° 20' 10"
💚 Data Parsing	RTK Extend: Enabled	Days Issued: 0	n/a n/a	Radius:	500 km
🗟 Simulation	Network RTK: Enabled Starfire Over IP: Enabled	Days Remaining: n/a	n/a		
< Almanac					
🏶 RINEX File Processing	Firmmon Tofa			Concellisence Chabue	
🔻 Receiver Setup				Cancer License Status	
🕑 StarFire QuickStart	Navigation: SAPPHIRE, 03.05.04, scn1, Co	D 2011 11.01.14 D 2012 17.09.02"	5 14:17:30	A previous license expired	on 02/23/2015 16:56:26
😽 Navigation Modes	PIO Boot: "3040, 02.01.04, scn1, Feb 11 2	011 14:22:38"		Code: 486b1800-9f753078	2-2-8f52ca-060076a1
🔣 Configure SF-3040 Radio	Bluetooth: "3040, 3.0.0 build 165"	2013 17632/3/			
Monitor SF-3040 Batteries				A previous license expired	on UZ/16/2015 23:03:52
				Code: af0e6201-8456c92a	-5ac3d656-07743886
	Communication		-	388	
	[MEAS1B], 462 bytes - 10:38:55	5	🔼 🔀 🤮 [ок] оч	TPUT	ĺ
	CHNLSTATUS1B], 407 bytes - :	10:38:55 88:55		ITPUT	Car
Connected Port: COM122		· · · · · ·		Friday	y, May 29, 2015 10: <u>38:55</u>

• If the Navigation version number is lower than *03.05.XX*, perform the following steps which follow



✓ Detailed Views → StarFire

🔅 StarUtil 3000: COM55								×
File Setup Tools View H	неір							
💿 User Guide 🛛 Input Terr	minal 🛛 🔒 View/Edit Profile 🛛 🕞 Data Logging 💋	🖲 Connections 🛛 🔅 F	references					
© Rover Info Corrections: NCT LAT: N 33° 50' 28 LON: W 008° 20' 3 HT: 8.8190 m	.6266" Status: StarFire Dual:RTG Co Status: StarFire Dual:RTG Co Summary: S Nav valid: 3D: Dual freq 0	rrection Age: 10.0 30 sec	Position: 8 Velocity: 8 Tracked: 1	ites PDOP: 2 HDOP: 1 10 VDOP: 2	9 .1 7	GPS Tir GPS Wi	ne: 247753 sek: 1550	
✓ Detailed Views	Dashboard × StarFire ×							
🖄 Position, Velocity, Time	License Info 🦛	StarFire			:::::			- G
🛒 StarFire								
💼 Channel Status	License Active?: Active	Signal		4	- 13	STON S	1. 1.1.1	
🔲 Meas1B	Time Period: Calendar	32		1.11	1			
🤌 Receiver Options	Precision Type: Precise	24		- Series		~~		
🍥 Sky Plot	Net Authorization: All	13.10				100		3.4
😟 NMEA	Issue Date: 06/09/2009 00:50:18	8			and in			2
10 View Raw Data	Start Date: 01/01/2009				100			
Rost Processing	End Date: 01/01/2010							
Data Bareira	Regional Selection: World Wide	Sat. ID: <b>525</b>						
	Digital Serial #: 10215	Satellite Locations						5
✓ Receiver Setup	1	ID	Angle	Longitude	Licensed?	In-Use	Satellite Select	
🕐 StarFire QuickStart		402	< 0	-98.500	Yes	0		
💸 Navigation Modes		609	< 0	109.000	Yes	0		
	Define Satellite 😽	525	< 45	25.000	Yes	0	M	
	Enter Frequency:	643	< 0	143.500	Yes	0		
	Enter Sat ID:	484	< 0	-15.500	Yes	0		
		User	n/a	n/a	n/a	0		
	Save Retrieve Delete	Auto						
	Communication		🕂 Input	Terminal				Þ
	STACKINFOA], 203 bytes - 13:48:55			[OK] OUTPU	Г			^
	[A2DA], 137 bytes - 13:48:55 [SELICENSER], 50 bytes - 13:48:55			[OK] OUTPU	Г			Send
Connected Port: COM55 Log I	File: None For Help, press F1					Loc	al time: 9-22-2009 :	13:48:56

Check StarFire signal C/No Value which should be above 0dB (>9dB is typical at NavCom's office in Southern California)

The C/No value varies based on the distance between the StarFire satellite and the receiver.



- ✓ Define Satellite
  - $\circ \quad \text{Select Detailed Views} \rightarrow \text{StarFire}$
  - Check Enter User-Defined Satellite
  - Set the *Frequency(KHz)* to *Satellite ID* per Table 3 for the appropriate area of operation

Older versions of StarUtil 3000 will not allow decimal place value to be entered. When this happens, utilize the Input Terminal window and the command [DEFINESFSAT]:

Example:

Command:	[DEFINESFSAT] define_delete, {satellite_id}, {frequency}
Parameter	Definition
Define_delete	Keyword (DEFINE, DELETE, NONE)
Satellite_id	Satellite ID number (integer) (320 to 680)
Frequency	Satellite frequency in kHz (min. = 1525000 kHz, max.= 1560000 kHz)

# [DEFINESFSAT] define, 525, 1545885.0

StarUtil 3000: COM55						_	
File Setup Tools View Help							
📀 User Guide 🛛 🖬 Input Termina	al 🛛 😹 View/Edit Profile 🛛 🕞 Data Logging 🌖	ኛ Connections 🛛 🔅 Prefe	rences				
Rover Info     Corrections: NCT     LAT: N 33° 50' 28.624     LON: W 008° 20' 37.4     HT: 8.8700 m	10" Status: D StarFire Dual:RTG C Summary: Summary: Nav valid: 3D: Dual freq 0	orrection Age: 9.0 Posit Velo 30 sec	Satellites           ion: 9         PDOP: 2.0           sity: 9         HDOP: 0.9           ked: 9         VDOP: 1.8		GPS Time: 2485 GPS Week: 1550	87 D	
✓ Detailed Views	Dashboard × StarFire ×						
🖄 Position, Velocity, Time 📘	icense Info 🚥 🕫	StarFire					<b>4</b> 3
🛒 StarFire							
💼 Channel Status	License Active?: Active	Signal	-			1-11-	
Meas1B	Time Period: Calendar	32		-			
🥜 Receiver Options	Precision Type: Precise	24				1.	
Sky Plot	Net Authorization: All	10.23					
₩ NMEA	Issue Date: 06/09/2009 00:50:18	8					
010 View Raw Data	Start Date: 01/01/2009			1.000			
Poet Processing	End Date: 01/01/2010						
Data Pareing	Regional Selection: World Wide	Sat. ID: 525					
Cinculation	Digital Serial #: 10215	Satellite Locations					43
V Receiver Setup		ID A	ngle Longitude	Licensed?	In-Use Sat	tellite Select	
StarFire QuickStart		402	< 0 -98.500	Yes	0		
😽 Navigation Modes		609	< 0 109.000	Yes	0		
	Define Satellite 💋	258	< 45 25.000	Yes			
	Enter Frequency: 1537452.5	643	< 0 143.500	Yes	0		
	Enter Sat ID: 526	484	< 0 -15.500	Yes	0		
		User	n/a n/a	n/a	0		
	Save Retrieve Delete	Auto					
	ommunication		Input Terminal				-10
	(G) [A2DA], 137 bytes - 14:02:50	~		Т			<b>^</b>
	G [SFLICENSEB], 50 bytes - 14:02:50			Т			~
							10 11

o Click Save



- ✓ Set the Alternate Satellite
  - $\circ$  Select Receiver  $\rightarrow$  Setup  $\rightarrow$  StarFire  $\rightarrow$  Alternate Channel
  - o Set the Alternate Channel to the appropriate Satellite ID as shown in Table 3 above



- o Click the Refresh button
- o After a few minutes, the receiver should be tracking the new StarFire Satellite
  - Check SF Satellite ID (refer to Table 3 for proper Satellite ID)
  - Check StarFire signal C/No Value which should be above 0dB (>9dB is typical at NavCom's office in Southern California)

If the receiver is moved from one StarFire region to another, the receiver will not automaticly tune to the new receiver frequency. When this occurs, repeat the initial steps with the appropriate new frequency and ID.

- Observe the operational mode and correction age
  - dGPS mode: StarFire Dual RTG or StarFire Dual GNSS

This coverage map shows the coverage after all frequencies are changed:







Effective Jan 2012 Red = Net 1 Blue = Net 2

Does not include the footprint for the 15.5W satellite

Back to 1<sup>st</sup> page



**NOTE:** This document relates to a legacy product that is no longer in production. The document may contain references to technology or marks, such as RTG or Real Time Gypsy, that are owned by the Jet Propulsion Laboratory of the California Institute of Technology or the National Aeronautics and Space Administration (NASA). As of July 15, 2015, current production NAVCOM products and services no longer utilize any technology of these entities.