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**DSIM-A
Installation Guide
Revision R**

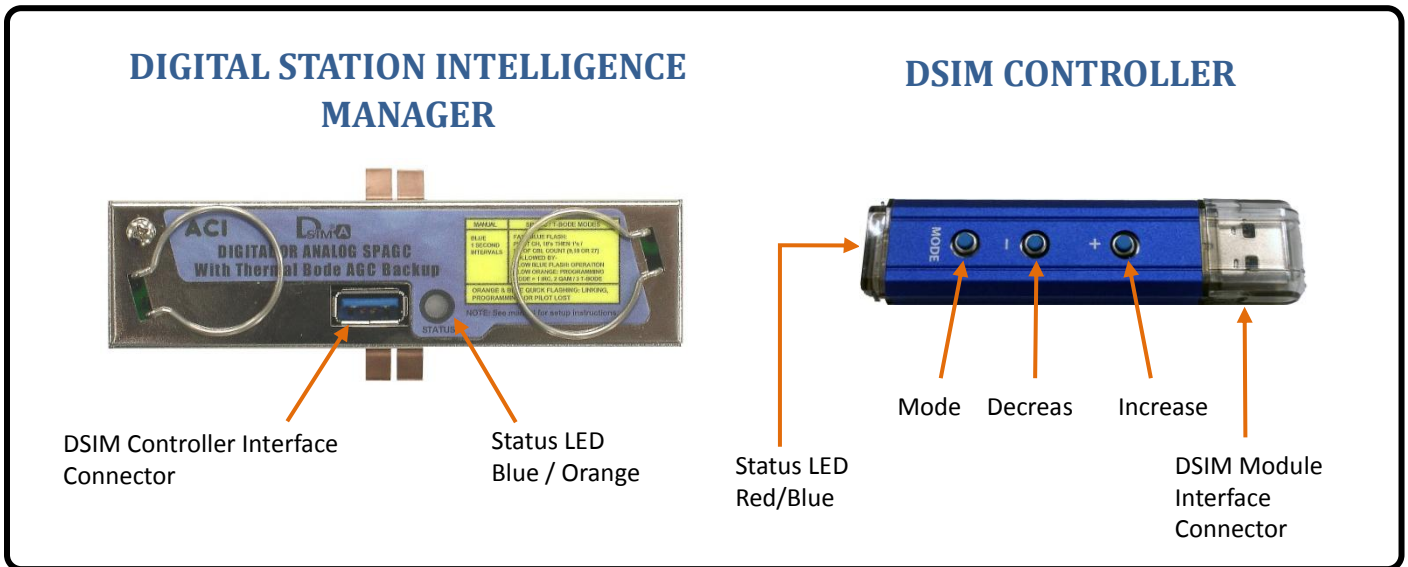
1. Quick Start Instructions for Single Pilot AGC Operatation

1. Remove the RF module cover and install the DSIM-A AGC module into the amplifier. Then re-install the RF module faceplate
2. Plug the controller into the DSIM.
3. Check and set desired amplifier levels.
4. Press mode button once. The controller light will flash blue and red for approximately 45 seconds.
5. When done the controller light will have a half second blue blink indicating that the DSIM is in AGC mode.
6. Remove the controller from the amplifier, and the DSIM is all set!

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2. DSIM AGC Module & DSIM Controller Overview



The Digital Station Intelligence Manager (DSIM) product line is the next generation of automatic gain control modules that provides the outside plant maintenance team with station diagnostic tools that are unprecedented in the industry. The DSIM AGC module is agile that allows the program settings to be modified at any time to change the pilot channel number and type from analog to digital or to change the operational mode into the SPAGC, thermal AGC, or manual modes of operation. Having this flexibility to reprogram the DSIM modules is a huge cost savings when doing system modifications over the fixed SPAGC or T-bode modules since only the program settings need to be changed instead of having to change out the entire AGC fixed module.

The DSIM module can be programmed to operate as a single pilot AGC or a thermal AGC. In the SPAGC mode the DSIM can be programmed to use either an analog or digital pilot signal from channels 52 to 142. If the pilot channel is lost, the DSIM module will default into a thermal TGC mode and then return to the single pilot SPAGC mode automatically once the pilot channel has been restored. In the thermal AGC mode the DSIM module can be programmed by the operator to have the upfront cable compensation settings at 9, 18, or 27 dB. The DSIM incorporates a bi-colored blue and orange LED that indicates the different operational modes and settings of the DSIM during setup and operation.

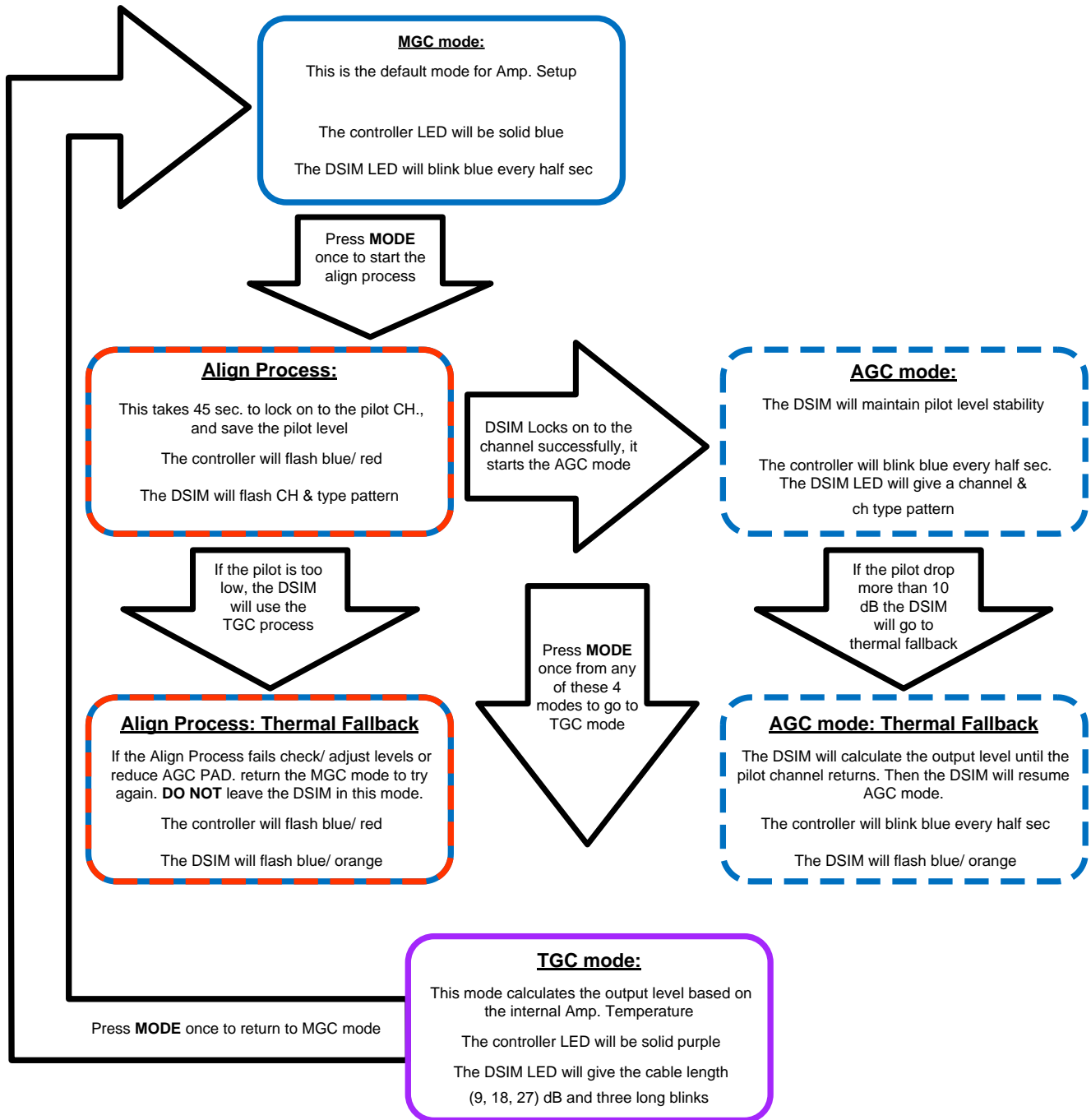
The DSIM controller is used to set the DSIM module's pilot channel and to change into the different operational modes during the amplifier setup. The bi-colored blue and red LED indicator's blinking patterns will denote the current optional mode setting.

The DSIM modules will be configured at the factory to have the default channel 88 digital (609.00 MHz) pilot channel programmed. The DSIM controller is used to set the DSIM modules to the customer selected pilot channel. In the setup of the DSIM module the pilot channel that is programmed into the controller is downloaded into the memory of the DSIM module. The pilot channel setting in the DSIM module can be changed in the future by simply using a controller with the new desired pilot channel programmed.

3. DSIM Mode Definitions

Operation Mode	Definition
MGC	<p>In the Manual Gain Control (MGC) mode the DSIM automatic gain control is turned off.</p> <p>The MGC mode is used during the setup of the station so that no gain adjustments are made when the levels and slopes are setup.</p>
AGC	<p>In Automatic Gain Control (AGC) mode will make gain adjustments to the station based on the level changes that occur on the pilot channel.</p>
TGC	<p>In Thermal Gain Control (TGC) mode the DSIM will make gain adjustments based on the changes in the internal temperature of the station. In the TGC mode there is a selection of 9, 18 or 27 dB for the amount of cable that is in front of the station. The dB of cable setting is used to more accurately predict actual losses that occur in the cable with the changes in the outside temperature.</p> <p>Note: Thermal operational mode should not be used in amplifiers that are pedestal mounted for underground networks. These units operate on the assumption that cable temperature will change at the same rate as amplifier temperature, while amplifiers mounted in pedestals will vary in temperature far greater than the underground cable temperature.</p>

DSIM Mode Flow Chart



4. DSIM Controller Operation Instruction Guidelines

Switch	Function	Description
+	Increase	In MGC Mode, Click to increase RF output level (See Note 1)
		In AGC Mode, no function
		In TGC Mode, Click to increase cable length value
-	Decrease	In MGC Mode, Click to decrease RF output level (See Note 1)
		In AGC Mode, no function
		In TGC Mode, Click to decrease cable length value
Mode	Mode Change	In MGC mode, Click to go to Align Mode to load controller channel setting, DSIM module will then automatically switch to AGC mode
		In AGC Mode, Click to return to TGC Mode
		In TGC Mode, Click to go to MGC Mode

Note 1: Making adjustment to the output levels is only recommended when setting up the DSIM modules in temperatures bellow 32°F / 0°C or above 104°F / 40°C.

5. DSIM Controller Status LED Essentials

LED Blinking Pattern	Indications
Quick Blue / Red Blinks	DSIM controller to module syncing process - Occurs when controller is installed into the DSIM module.
	Aligning process: in progress
Steady on Blue	In MGC Mode
Series of Blue Blinks	In AGC Mode
Steady on Purple	In TGC Mode

6. DSIM Module Status LED Essentials

Operation Blinking Patterns for DSIM Module:

LED Blinking Pattern	Indications
Steady Repeating Blue Dashes	Manual Mode
Series of Blue Blinks	Pilot Channel Number - See tables in section 9 at the end of the guide for blinking sequences
Single Blue Long Dash Between Series of Blue Blinks	Analog channel is set
2 Blue Long Dashes Between Series of Blue Blinks	Digital channel is set
3 Blue Long Dashes Between Series of Blue Blinks	TGC Mode - The default cable length setting for TGC mode is 27 dB of cable in front of the amplifier
Quick Blue / Orange Blinks	Pilot paste in progress - Wait or Pilot channel not found or lost

LED Fault Conditions Blinking Patterns

LED Blinking Pattern	Indications
Steady on Pink	24 volt input into DSIM module is out of the operational range of 21.5 to 26.5 VDC. If this occurs, check for correct AC voltage input to the amplifier and for correct output DC voltage of internal power supply to the RF module
Steady Repeating Orange Blinks	Temperature in DSIM module is too high / low (above 221°F/105°C or below -40°F/-40°C)
Quick Blue / Orange Blinks	Pilot Lost; DSIM automatically switches to Thermal (TGC) mode until Pilot channel is restored.

Note 2: The DSIM LED blinks after the pilot channel count will be orange during programming and blue when in operation.

7. Single Pilot AGC Standard Setup

The DSIM controllers will come preset to have a desired pilot channel stored in the memory. The controller is used to set the DSIM module to the desired pilot channel by downloading the pilot channel program into the DSIM module's memory during setup.

1. With the power off install the DSIM into the amplifier. (If not already installed)
2. For new amplifiers installations, power on the amplifier and allow it to warm up for about 20 minutes.
3. Plug the controller into the DSIM.
4. The controller LED will then flash red / blue rapidly while the DSIM controller and DSIM module completes the syncing process. This process will take approximately 2-3 seconds to complete.
5. Once the controller LED stops flashing the red / blue sequence, it should then display a constant blue, indicating that it is in MGC (manual) mode. Note: If the controller LED is flashing blue, it indicates that it is in AGC mode; click "Mode" button two times to go from AGC mode to MGC Manual Mode. In addition, if the controller LED displays a constant purple, it indicates that it is in TGC mode; click "Mode" button once to go from TGC to MGC Manual Mode.
6. Set the level and slope of the amplifier to the design specifications with the input pad and Equalizer.
7. If the outside temperatures are below 32°F / 0°C or above 104°F / 40°C, then the RF levels will need to be adjusted to ensure that the full gain compensation range of the DSIM will be available over the operational temperature range. If the outside temperatures are between 32°F / 0°C and 104°F / 40°C then go to step 11.
8. Measure and record the RF output level of the amplifier at the highest operating frequency. Using the table bellow adjust the RF output level by pushing the "+" button to increase or the "-" button to decrease the RF output level. Pressing the button once is used for small increments, holding the button down is for large increments.

Below -13°F(-25°C)	-2dB
Between 32°F(0°C) & -13°F(-25°C)	-1dB
Between 32°F(0°C) & 104°F(40°C)	no change
Between 104°F(40°C) & 122°F(50°C)	+1dB
Above 122°F(50°C)	+2dB

9. After the RF level adjustment of the DSIM AGC module has been made, reset the RF output level to the value recorded in step 8 by adjusting the input pad value.
10. All DSIMs have a thermal fallback default setting of 27 dB. To change it, push the MODE button twice. The controller LED should be purple indicating TGC mode. There are three TGC factor options: 9 dB, 18 dB and 27 dB. The blinking pattern should indicate 27dB. Push the '-' button once for 18 dB or twice for 9 dB. Check the blink pattern to verify thermal fallback value.
 - a. Blink patterns for TGC
 - i. 27 dB (2 fast blinks, pause, 7 fast blinks, pause, 3 long blinks)
 1. For more than 1000ft of cable before the amplifier
 - ii. 18 dB (1 fast blink, pause, 8 fast blinks, pause, 3 long blinks)
 1. For 600ft - 1000ft of cable before the amplifier
 - iii. 9 dB (9 fast blinks, pause, 3 long blinks)
 1. For less than 600ft of cable before the amplifier
11. Press the 'Mode' once to go to MGC mode. Check that the output level and slope are correct. Once level and slope are set, press "Mode" once to exit MGC (manual) mode. The DSIM will now go thru the alignment process. The LED on the controller will flash blue and red (about 45 seconds) until the alignment process has completed.
12. When the alignment process has completed, the controller LED will blink blue indicating that the DSIM is now in the AGC mode. If the LED does not change to blinking blue, and instead DSIM LED flashes blue and orange the pilot signal is either too high or too low going into the DSIM. Check the output signal to verify that you have the correct output levels and also verify that the pilot channel is present and the correct type of digital or analog. Press the mode button 2 times and then go back to step 11.
13. Check the LED on the DSIM Module to make sure the channel number is right. Refer to section 9 for pilot channel blinking count overview.
14. Remove the controller from the amplifier, and the DSIM is all set!

8. Thermal AGC Setup

In setting up the DSIM modules as a Thermal AGC the cable length dB values will need to be adjusted to match the dB of cable that is in front of the station. The DSIM controllers will come preset to have a default cable length setting of 27 dB in the memory. The controller is used to set the DSIM module to either 9 dB, 18 dB, or 27 dB of cable by simply clicking the “Increase” or “Decrease” +/- buttons on the controller.

1. With the power off install the DSIM into the amplifier. (If not already installed)
2. For new amplifiers installations, power on the amplifier and allow it to warm up for about 25 minutes with the housing lid closed.
3. Plug the controller into the DSIM.
4. The controller LED will then flash red / blue rapidly while the DSIM controller and DSIM module completes the syncing process. This process will take approximately 2-3 seconds to complete.
5. Once the controller LED stops flashing the red / blue sequence, it should then display a constant blue, indicating that it is in MGC (manual) mode. Click “Mode” button twice to go from MGC to TGC. The LED on the controller should now be a constant purple. Note if the LED is flashing fast for the AGC channel count followed by an orange 1 or 2 blink, click the "Mode" button once to change from AGC to TGC.
6. All DSIMs have a TGC default setting of 27 dB. There are three TGC factor options: 9 dB, 18 dB and 27 dB. The blinking pattern should indicate 27dB. Push the '-' button once for 18 dB or twice for 9 dB. Check the blink pattern to verify TGC value.
 - a. Blink patterns for TGC
 - i. 27 dB (2 fast blinks, pause, 7 fast blinks, pause, 3 long blinks)
 1. For more than 1000ft of cable before the amplifier
 - ii. 18 dB (1 fast blink, pause, 8 fast blinks, pause, 3 long blinks)
 1. For 600ft - 1000ft of cable before the amplifier
 - iii. 9 dB (9 fast blinks, pause, 3 long blinks)
 1. for less than 600ft of cable before the amplifier
7. Click +/- button to go to the desired cable length setting choosing from 9 dB, 18 dB, or 27 dB. This cable length dB setting is the dB amount of cable in front of the amplifier.

- Check the LED on the DSIM Module to make sure the cable length setting is correct.

Cable Length dB Value	Set 1	Set 2	Set 3
9 dB	9-Dits	-	3 Long Dashes Blue-Operation Orange-Programming
18 dB	1-Dit	8-Dits	
27 dB	2-Dits	7-Dits	

- Set the level and slope of the amplifier to the design specifications with the input pad and Equalizer.

NOTE: The station will heat up when the amplifier housing is closed, causing the slope and levels to increase by approximately 0.5 to 0.75 dB.

- Remove the controller from the amplifier, and the DSIM is all set!

9. LED Pilot Channel Blink Series Overview

Channel	IRC	HRC	DIGITAL	Set 1	Set 2	Set 3	Set 4
	MHz	MHz	MHz	Blue	Blue	Blue	Blue-Operation Orange-Programming
52	391.25	390.020	393.00	5-Dits	2-Dits		1 IRC / 2 DIGITAL Long dash
53	397.25	396.020	399.00	5-Dits	3-Dits		
54	403.25	402.020	405.00	5-Dits	4-Dits		
55	409.25	408.020	411.00	5-Dits	5-Dits	-	
56	415.25	414.021	417.00	5-Dits	6-Dits	-	
57	421.25	420.021	423.00	5-Dits	7-Dits	-	
58	427.25	426.021	429.00	5-Dits	8-Dits	-	
59	433.25	432.022	435.00	5-Dits	9-Dits	-	
60	439.25	438.022	441.00	6-Dits	1-Dash	-	
61	445.25	444.022	447.00	6-Dits	1-Dits	-	
62	451.25	450.023	453.00	6-Dits	2-Dits	-	
63	457.25	456.023	459.00	6-Dits	3-Dits	-	
64	463.25	462.023	465.00	6-Dits	4-Dits	-	
65	469.25	468.023	471.00	6-Dits	5-Dits	-	
66	475.25	474.024	477.00	6-Dits	6-Dits	-	
67	481.25	480.024	483.00	6-Dits	7-Dits	-	
68	487.25	486.024	489.00	6-Dits	8-Dits	-	
69	493.25	492.025	495.00	6-Dits	9-Dits	-	
70	499.25	498.025	501.00	7-Dits	1-Dash	-	
71	505.25	504.025	507.00	7-Dits	1-Dits	-	
72	511.25	510.026	513.00	7-Dits	2-Dits	-	
73	517.25	516.026	519.00	7-Dits	3-Dits	-	

Channel	IRC	HRC	DIGITAL	Set 1	Set 2	Set 3	Set 4
	MHz	MHz	MHz	Blue	Blue	Blue	Blue-Operation Orange-Programming
74	523.25	522.026	525.00	7-Dits	4-Dits		1 IRC / 2 DIGITAL Long dash
75	529.25	528.026	531.00	7-Dits	5-Dits		
76	535.25	534.027	537.00	7-Dits	6-Dits	-	
77	541.25	540.027	543.00	7-Dits	7-Dits	-	
78	547.25	546.027	549.00	7-Dits	8-Dits	-	
79	553.25	552.028	555.00	8-Dits	9-Dits	-	
80	559.25	558.028	561.00	8-Dits	1-Dash	-	
81	565.25	564.028	567.00	8-Dits	1-Dits	-	
82	571.25	570.029	573.00	8-Dits	2-Dits	-	
83	577.25	576.029	579.00	8-Dits	3-Dits	-	
84	583.25	582.029	585.00	8-Dits	4-Dits	-	
85	589.25	588.029	591.00	8-Dits	5-Dits	-	
86	595.25	594.030	597.00	8-Dits	6-Dits	-	
87	601.25	600.030	603.00	8-Dits	7-Dits	-	
88	607.25	606.030	609.00	8-Dits	8-Dits	-	
89	613.25	612.031	615.00	8-Dits	9-Dits	-	
90	619.25	618.031	621.00	9-Dits	1-Dash	-	
91	625.25	624.031	627.00	9-Dits	1-Dits	-	
92	631.25	630.032	633.00	9-Dits	2-Dits	-	
93	637.25	636.032	639.00	9-Dits	3-Dits	-	
94	643.25	642.032	645.00	9-Dits	4-Dits	-	
100	649.25	648.032	651.00	1-Dits	1-Dash	1-Dash	

Channel	IRC	HRC	DIGITAL	Set 1	Set 2	Set 3	Set 4
	MHz	MHz	MHz	Blue	Blue	Blue	Blue-Operation Orange-Programming
101	655.25	654.033	657.00	1-Dits	1-Dash	1-Dits	1 IRC / 2 DIGITAL Long dash
102	661.25	660.033	663.00	1-Dits	1-Dash	2-Dits	
103	667.25	666.033	669.00	1-Dits	1-Dash	3-Dits	
104	673.25	672.034	675.00	1-Dits	1-Dash	4-Dits	
105	679.25	678.034	681.00	1-Dits	1-Dash	5-Dits	
106	685.25	684.034	687.00	1-Dits	1-Dash	6-Dits	
107	691.25	690.035	693.00	1-Dits	1-Dash	7-Dits	
108	697.25	696.035	699.00	1-Dits	1-Dash	8-Dits	
109	703.25	702.035	705.00	1-Dits	1-Dash	9-Dits	
110	709.25	708.035	711.00	1-Dits	1-Dits	1-Dash	
111	715.25	714.036	717.00	1-Dits	1-Dits	1-Dits	
112	721.25	720.036	723.00	1-Dits	1-Dits	2-Dits	
113	727.25	726.036	729.00	1-Dits	1-Dits	3-Dits	
114	733.25	732.037	735.00	1-Dits	1-Dits	4-Dits	
115	739.25	738.037	741.00	1-Dits	1-Dits	5-Dits	
116	745.25	744.037	747.00	1-Dits	1-Dits	6-Dits	
117	751.25	750.038	753.00	1-Dits	1-Dits	7-Dits	
118	757.25	756.038	759.00	1-Dits	1-Dits	8-Dits	
119	763.25	762.038	765.00	1-Dits	1-Dits	9-Dits	
120	769.25	768.038	771.00	1-Dits	2-Dits	1-Dash	
121	775.25	774.039	777.00	1-Dits	2-Dits	1-Dits	
122	781.25	780.039	783.00	1-Dits	2-Dits	2-Dits	

Channel	IRC	HRC	DIGITAL	Set 1	Set 2	Set 3	Set 4
	MHz	MHz	MHz	Blue	Blue	Blue	Blue-Operation Orange-Programming
123	787.25	786.039	789.00	1-Dits	2-Dits	3-Dits	1 IRC / 2 DIGITAL Long dash
124	793.25	792.040	795.00	1-Dits	2-Dits	4-Dits	
125	799.25	798.040	801.00	1-Dits	2-Dits	5-Dits	
126	805.25	804.040	807.00	1-Dits	2-Dits	6-Dits	
127	811.25	810.041	813.00	1-Dits	2-Dits	7-Dits	
128	817.25	816.041	819.00	1-Dits	2-Dits	8-Dits	
129	823.25	822.041	825.00	1-Dits	2-Dits	9-Dits	
130	829.25	828.041	831.00	1-Dits	3-Dits	1-Dash	
131	835.25	834.042	837.00	1-Dits	3-Dits	1-Dits	
132	841.25	840.042	843.00	1-Dits	3-Dits	2-Dits	
133	847.25	846.042	849.00	1-Dits	3-Dits	3-Dits	
134	853.25	852.043	855.00	1-Dits	3-Dits	4-Dits	
135	859.25	858.043	861.00	1-Dits	3-Dits	5-Dits	
136	865.25	864.043	867.00	1-Dits	3-Dits	6-Dits	
137	871.25	870.044	873.00	1-Dits	3-Dits	7-Dits	
138	877.25	876.044	879.00	1-Dits	3-Dits	8-Dits	
139	883.25	882.044	885.00	1-Dits	4-Dits	9-Dits	
140	889.25	888.044	891.00	1-Dits	4-Dits	1-Dash	
141	895.25	894.045	897.00	1-Dits	4-Dits	1-Dits	
142	901.25	900.045	903.00	1-Dits	4-Dits	2-Dits	

Note 3: The DSIM will function correctly on either the analog IRC or HRC channel frequencies. When using the HRC channel spacing the IRC channel controllers can be used.

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