

ADDENDUM TO INTELIPORT III (24V4) MODEL IFT5616 (ISSUE 2)

1. GENERAL

1.01 This ADDENDUM is being issued to provide information for an additional feature incorporated into Teltrend's INTELIPORT III, 24V4-type module (Model IFT5616, Issue 2). under the DTMFcontrolled mode of operation. The feature incorporated provides for Transhybrid Loss (THL) measurement test while operating in the Quiet Termination/Transponder (#5) mode of operation and operates in the same manner as the THL tests currently used with the " #7 " (Signaling Test Mode) feature.

2. CHANGES

2.01 From the Quiet Termination mode, " #5 ", the STC can enter the DTMF code " *1* ", which causes INTELIPORT to provide a THL Reference as it applies a short across the 2W port (simulating an off-hook condition). The STC can then enter the DTMF code " 2* " which causes INTELIPORT to replace the short with a 600 Ohm, +2.15uF termination (simulating an on-hook condition) and permits THL measurements. Upon completion, the STC enters the DTMF code " 3* " which causes INTELIPORT to reconnect the 2W port to the customer's equipment and permits THL measurements. After completing THL testing, the STC enters the DTMF code " # ", which causes INTELIPORT to return to the command mode.

INFORMATION TO BE ADDED

2.01 In Table 2, under the Quiet Termination Mode and after Level Verification Test, please add the following:

- Send Off-Hook and sets up THL Reference Mark 1*
- Send On Hook and Connects 2.15uF to 2W Port 2*
- Re-connects 2W Port for THL Measurements 3*

2.02 Add new paragraph (3.22) after 3.21

3.22 In addition to the above, the STC can also perform THL measurements from the Quiet Term/Transponder mode of operation. The code "1*" allows the STC to set up a THL (Transhybrid Loss) reference mark as INTELIPORT applies a short across the 2W port [simulating an off-hook (busy) condition]. The code " 2* " causes INTELIPORT to replace the short with a 600-Ohm, +2.15uF termination (simulating an on-hook condition) and allows for THL measurements. The code " 3* " allows the STC to reconnect the 2W port to the customer's equipment and allows for THL measurements. The STC then returns to the command mode by entering the code " # ".

Command Mode Access

2.03 In Table 5, under the Testing And Alignment Procedures (DTMF-Controlled Method), Step 6, please add the following:

THL Measurement Test

From quiet termination, enter:

- " 1* " (Sets up THL reference mark and applies short across 2W port - Verify)
- " 2* " (Replaces short with 600-Ohm, +2.15uF termination - perform THL measurement)
- " 3* " (Reconnects 2W port to equipment - perform THL measurement)

ADDENDUM TO INTERLIPOORT® III (24V4) MODEL IFT5616 (ISSUE 2)

1. GENERAL

1.01 This ADDENDUM is being issued to provide information for several changes that have been incorporated into Teltrend's INTELIPORT III (24V4-type module), Model IFT5616 (Issue 2). One of the changes affects the method in which the intelligent identification tone is sent when the unit is accessed. The other changes include an added feature for entering the command mode from the loopback mode and the addition of a " 0* " command added to the DTMF-controlled " #5 " (Quiet Termination/Transponder) function.

2. CHANGES

2.01 The following paragraphs describe the changes made to the IFT5616, Issue 2. At the time of the next printing, these changes will be incorporated into the IFT5616, Issue 2 (INTELIPORT III) technical documentation.

Intelligent ID Tone

2.02 The IFT5616, Issue 2, will automatically output an ID tone of alternating 1004Hz/2804Hz for less than one second whenever 2713Hz is present for greater than 1.5 seconds. Originally, the IFT5616 would output the ID tone only when 2713Hz was removed and the unit entered loopback. No ID tone was sent when the unit entered the command mode (i.e., 2713Hz applied for more than 30 seconds).

2.03 This change was incorporated to eliminate the possibility of Macro command failures which were caused by the interference of the ID tone being detected during the 1004Hz sampling window. In addition, this new method also provides for an intelligent unit identification whenever the loopback mode or command mode is accessed.

Command Mode Access

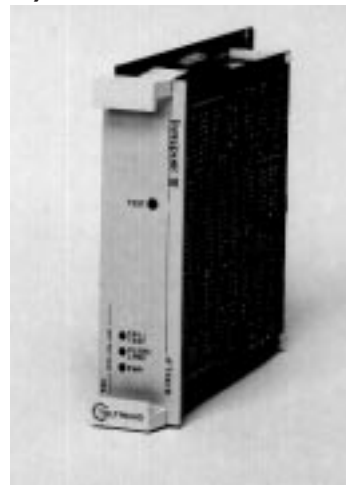
2.04 From the normal 2713Hz loopback mode of operation, the STC can now return to the command mode from the loopback mode by sending the DTMF command "#". This new feature allows for a quicker access back to the command mode as opposed to dropping out of loopback and re-sending 2713Hz for greater than 30 seconds.

Maintenance Test Feature " 0* "

2.05 While in the DTMF-controlled " #5 " Quiet Termination/Transponder mode of operation, the STC can now enter a DTMF command " 0* ". When entered, this command is used to effect an off-hook (T&R short) condition with quiet termination for performing various installation and maintenance tests. Upon completing these tests, the STC can enter another valid DTMF command to perform other functions or can enter the DTMF command " # " to return the IFT5616 to the command mode.

INTELIPOINT® III
(ISSUE 2)
2W TO 4W REPEATER INTERFACE (24V4)
MODEL IFT5616
 (*CLEI™ Code: VR24H4K7AA)

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1. GENERAL

1.01 Teltrend's INTELIPOINT III, Model IFT5616 Issue 2, is an intelligent 2-wire to 4-wire repeater that provides a network terminating interface for PBX trunk circuits or off-premises extensions. As a member of Teltrend's family of Intelligent Network Channel Terminating Equipment (INCTE), the IFT5616 performs all functions of a standard 24V4-type repeater unit while providing remote and automatic alignment capability when accessed from a Serving Test Center (STC). INTELIPOINT III contains an integral microprocessor that controls all internal functions of the unit and a precision oscillator circuit that generates the required test tones during maintenance and alignment routines. INTELIPOINT III is activated remotely by using a full frequency method or by sending appropriate DTMF commands to initiate the intelligent functions. Upon completing testing and alignment, INTELIPOINT III automatically calculates the amount of gain and equalization required for proper level coordination between the facility and equipment based on information received from the STC.

1.02 This practice is being revised to include an additional THL Measurement feature accessible while in the Quiet Term/Transponder mode of operation. Whenever this practice is reissued or revised, the reason for reissue or revision will be stated in this paragraph.

1.03 Features of Teltrend's Issue 2, 24V4 (IFT5616) are as follows:

- Provides the interface between a 4-wire facility and a 2-wire station circuit with loop signaling
- Terminating impedance option of 150/600/1200 ohms for matching the impedance of the facility; Equipment-side impedance is 600 or 900 ohms purely resistive or in series with a 2.1 6uF capacitor
- DTMF- or frequency-controlled command code activation
- Microprocessor controlled circuitry
- Precision oscillator generates required tones during alignment and maintenance routines
- Factory-set transmission levels of -4.0dBm (2W RCV OUT); 0.0dBm (2W XMT IN); 0.0dBm (4W XMT OUT); If required, levels can be remotely set for any level from +7 to -16dBm
- Remote or automatic alignment capability

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72-5616-00

- Automatically adjusts receive channel amplitude response characteristics (up to 1 5dB) using threetonesorfourtoneson loadedornonloaded cable to meet C5 conditioning
- Automatic 4-tone sweep or manual, full-range (300Hz to 3200Hz, in 100Hz steps) transponder mode with quiet termination
- Non-volatile memory retains programmed information in the event of power loss
- Manual or tone-activated loopback (equal-level or customer's RCV and XMT level) for testing and maintenance purposes
- Remotely switchable SX-to-A&B Norm/Rev
- Front-panel switch to manually activate the unit's test mode for verifying station wiring or to manually activate the auto-align feature
- Front-panel LEDs indicate the operational status of the unit
- Low power operation; - 42 to -56Vdc, 65mA nominal
- Mounts in a Teltrend Type 550 shelf (Type-400 equiv.)
- 7-year warranty

2. APPLICATIONS

2.01 INTELIPORT III interfaces a 4W facility with a 600- or 900-ohm, purely resistive or in series with a +2.1 6uF, 2W loop circuit. In general, INTELIPORT III can be used in any network interface application requiring 2-wire to 4-wire conversion, voice-frequency signaling conditioning, or passive dc signaling interface. In addition to performing the standard functions of a 24V4-type repeater, INTELIPORT III provides a wide range of maintenance and testing functions, including remote and automatic alignment capability with respect to 3- or 4-tones, remote setting of the unit's transmission levels, equal-level and/or customer's receive level loopback, and remote control SX to A&B lead reversal. Other features include quiet termination of the 2-wire port for performing noise and return loss tests, tone level verifications tests via a transponder mode of operation, and verification of dc-loop signaling tests. The integral microprocessor of INTELIPORT controls the testing and alignment functions when activated from a manual or automated Serving Test Center (STC) via DTMF or frequency-controlled commands.

2.02 The operating levels of INTELIPORT are factoryset for -4.0dBm (RCV OUT), 0.0dBm (XMT IN) and 0.0dBm (XMT OUT). If required and while operating in the DTMF-controlled command mode only, the operating levels of each port can be remotely set by the STC for any level from +7 to -1 6dBm.

Command Mode

2.03 The IFT5616 incorporates a command mode in which all functions, except manual activation of the wire test mode, manual activation of the autoalign feature, and 2713Hz tone-activated loopback, are accessed. Once in the command mode, INTELIPORT's functions are initiated by the STC sending either DTMF command codes or specific frequencies that prompt INTELIPORT to carry out the function based on instruction received from the STC. When in the command mode, the choice of sending either DTMF or frequencies must be made. If the DTMF method is chosen, the STC must stay with DTMF. If the frequency method is chosen, the STC must stay with frequencies.

2.04 After entering a command, INTELIPORT outputs a tone indicating the command received is valid (accepted command) or invalid (rejected command) (see Table 1). NOTE: If the STC does not have audible monitoring capability, INTELIPORT provides a terminal mode of operation that changes the normal response tones to steady tones so that the STC can monitor the response tones through the use of measuring test sets.

Alignment (3- Or 4-Tone)

2.05 The IFT5616 features three- or four-tone alignment. The four-tone alignment allows a more accurate equalization when interfacing long sections of loaded cable or a mixture of loaded and nonloaded cable.

Table 1. Response Tones

TONE	RESPONSE	
	NORMAL MODE	TERMINAL MODE
COMMAND MODE	INTERRUPTED 404Hz	STEADY 404Hz
ACCEPT (VALID)	BURST OF 2804Hz (BEEP)	STEADY 1004Hz
REJECT (INVALID)	ALTERNATING 404/1004Hz	STEADY 2804Hz

3. FUNCTIONAL OPERATION

3.01 Refer to Figure 1, the IFT5616 (INTELIPOINT III) Block Diagram, as needed while reading the following description. Since commands can be sent in the form of DTMF codes or by sending specific frequencies, the text is arranged in sections describing features that are accessible using each method. Paragraphs 3.10 through 3.31 describe the features that are activated using DTMF codes. Paragraphs 3.32 through 3.43 describe the features that are activated using frequencies.

3.02 The IFT5616 is equipped with three front panel LEDs that provide a quick visual indication to the particular mode the unit is in. A table is provided with Figure 2 (Option Location Diagram) showing a summary of the LED functions.

Option Switches

3.03 The IFT5616 contains three option switches that must be set prior to installing the unit. S1 (Facility Impedance) provides for selecting the terminating impedance of the unit (150/600/1200 ohms) that will match the impedance of the facility. S2/3 (600/900) provides for proper interfacing with the customer's 2W equipment. S4 (RES/2.16) provides for selecting a 600 or 900 ohm interface that is purely resistive or a 600 or 900 ohm interface in series with 2.16 μ F.

Wiring Test

3.04 Once the installer connections are complete and the unit is installed, it is recommended that the installer manually activate INTELIPOINT's test mode to verify installation and station wiring. Momentarily pressing the pushbutton switch, located on INTELIPOINT's front panel, for less than five seconds, causes continuous 1004Hz ($\pm 1\%$) to be applied to the receive channel ports (RCV IN and 2W IN/OUT ports) and interrupted 1004Hz ($\pm 1\%$) to the 4-wire transmit out port. If the switch is pressed and held for more than five seconds, INTELIPOINT recognizes this as a prompt to enter auto-align.

3.05 Station wiring is verified by connecting a Transmission Measuring Set (TMS) with a built-in speaker, or other suitable listening device (such as a hand-set or built-in), to the RCV and XMT pairs at the cable connection and demarcation points and listening for the appropriate tones.

3.06 Momentarily pressing the switch again ends the test mode. The test mode automatically times out after one hour if the switch is not pressed a second time. If desired, the test mode can be remotely released from the

STC by sending 2713Hz for more than five seconds, 10 to 60 minutes after initial activation.

Command Mode

3.07 INTELIPOINT's intelligent functions are accessed through a command mode of operation. The command mode is the operational state in which INTELIPOINT monitors its receive input for DTMF signals or frequencies and interprets these signals as commands. INTELIPOINT's command mode is remotely activated by the STC sending 2713Hz to the RCV IN port (RT and RR, pins 7 and 13) for more than 30 seconds followed by removal of tone. NOTE: If 2713Hz is not sent for at least 30 seconds, INTELIPOINT enters loopback.

3.08 After meeting the requirement above, INTELIPOINT sends an acknowledgement tone (interrupted 404Hz ($\pm 1\%$) via the XMT OUT port (pins 41 and 47), indicating command mode initiation. While in the command mode, INTELIPOINT is ready to receive instructions from the STC. At this point, the STC can access any of INTELIPOINT's functions from the Command Mode Menu outlined in Table 2. These functions can be initiated by DTMF command codes or by sending specific frequencies. NOTE: The two methods cannot be interchanged within the same command session. If the DTMF method is chosen, the STC must stay with DTMF. If the frequency method is chosen, the STC must stay with frequencies. The STC can, however, begin with DTMF, release, then reaccess the command mode and proceed with frequencies.

3.09 As mentioned, Paragraphs 3.10 through 3.31 describe the DTMF-controlled command mode functions. Paragraphs 3.32 through 3.43 describe the frequency-controlled command mode functions. Paragraphs 3.44 and 3.45 describe the auto-align feature.

Command Mode Menu - DTMF Controlled Method

3.10 From the DTMF-controlled command mode, INTELIPOINT's functions are initiated by sending DTMF command codes entered from a terminal or standard DTMF keypad. To initiate a function, the STC enters a "#" followed by the specific digit or character that controls the function to be performed. The only exception to this is the terminal mode of operation which is initiated by sending the DTMF command "86". The terminal mode changes INTELIPOINT's normal response tones to steady tones (see Table 1) so that the STC can monitor the response tones through terminal equipment that does not have audible monitoring capability. When

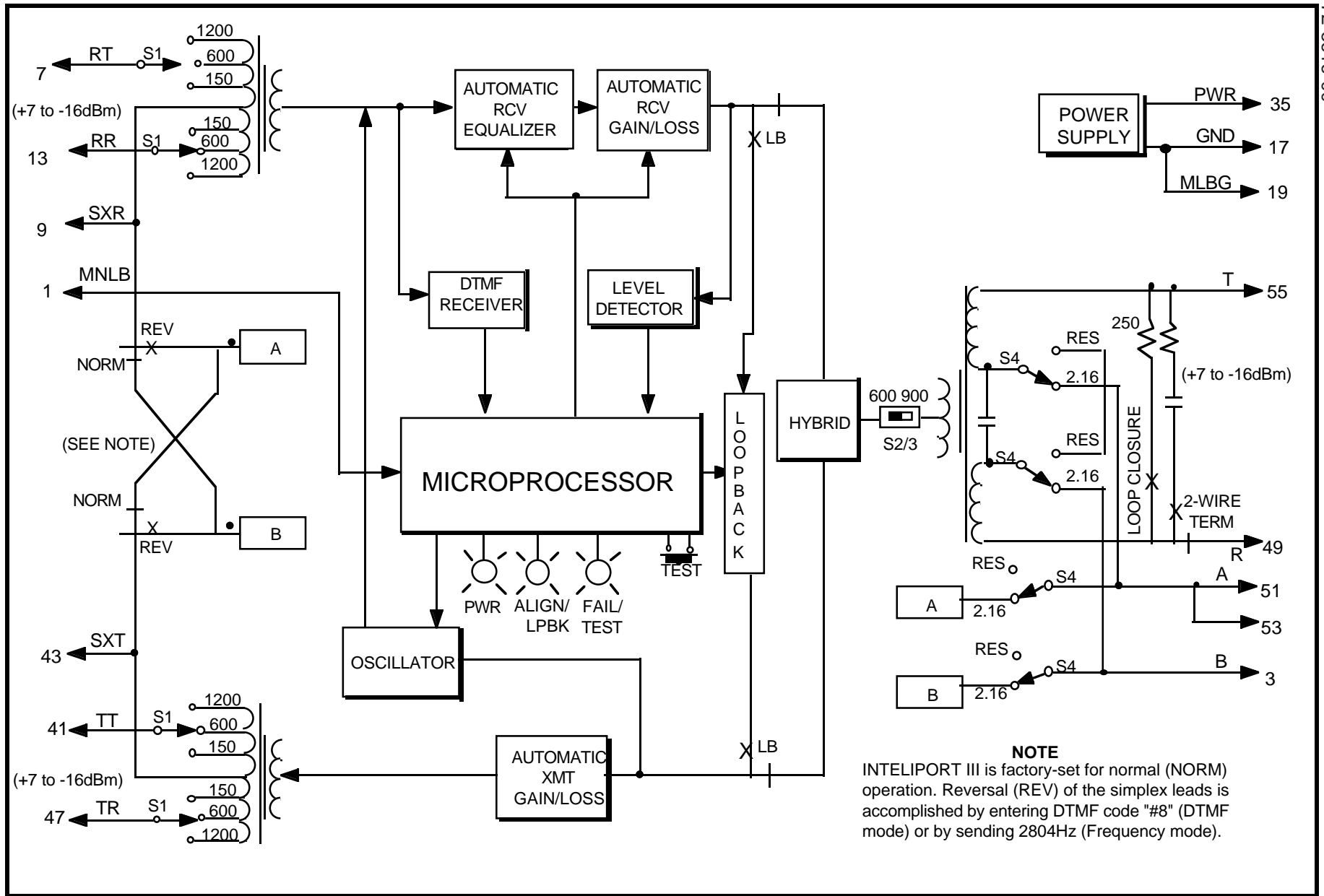


Figure 1. INTELIPORT III (IFT5616, Issue 2) Block Diagram

FUNCTION	SEND DTMF COMMAND	SEND FREQUENCY
TERMINAL MODE	86	NA
SET 2W RCV OUT (FACTORY-SET = -4.0)	#1	NA
SET 2W XMT IN (Factory-set = 0.0)	#2	NA
SET 4W XMT OUT (Factory-set = 0.0)	#3	NA
(For negative level, enter 3-digit code)		
(For positive level, enter "*" then 3-digit code)		
Restore factory settings	****	
REMOTE ALIGNMENT MODE	#4	1004Hz
		UNIT ENTERS LOOPBACK UPON COMPLETION
Escape	2713Hz >5 sec.	2713Hz > 5 sec.
QUIET TERMINATION MODE	#5	404Hz
4-Tone Auto-Sweep Transponder	4*	404Hz
Full-Range Transponder	03 - 32	300 - 3200Hz
Return To Command Mode	##	2713Hz > 5 sec.
Level Verification Test:		
•(1004Hz Reference At XMT OUT Port)	*0	NA
•(Verification of RCV OUT Port)	*1	NA
•(Verification of XMT IN Port)	*2	NA
•(Verification of XMT OUT Port)	*3	NA
•Send Off-Hook and sets up THL Reference Mark	1*	NA
•Send On-Hook and Connects 2.15uF to 2W Port	2*	NA
•Re-connects 2W Port For THL Measurements	3*	NA
Return to Command Mode	##	NA
Escape 2713Hz > 5 sec.		
CUSTOMER'S LOOPBACK LEVEL VERIFICATION	#6	NA
Return to Command Mode	##	NA
SIGNALING TEST MODE	#7	NA
•(THL Reference; applies short across 2W port)	"1"	NA
•(THL Measurements; replaces short with 600 ohm +2/16uF termination)	"2"	NA
•(THL Measurements; reconnects 2W port)	"4"	NA
Return to Command Mode	##	NA
SX-ToA&B LEAD NORM/REV (Factory-set = NORM)	#8	2804Hz
•Set to NORM (SXR to A; SXT to B)	"1"	(TOGGLE)
•Set to REV (SXR to B; SXT to A)	"2"	
Return to Command Mode	##	AUTOMATIC
EQUAL-LEVEL LOOPBACK	#0	UNIT ENTERS LOOPBACK AFTER ALIGNMENT
Return to Command Mode	##	2713Hz > 5 sec.
Return to Idle	2713Hz > 0.9 sec.	2713Hz > 0.9 sec.
RELEASE	###	2713Hz > 5 sec.
AUTO-ALIGN	NA*	1804Hz
*NOTE: Auto-align can be activated by pressing and holding front panel switch for > 5 sec.		
Release		AUTOMATIC

NOTE: If unit is left in command mode for more than five minutes without entering a code, INTELIPORT drops out of the command mode and returns to normal (idle) operation. If unit returns to idle without entering the RELEASE command ("##", DTMF method; 2713Hz, Frequency method), any information that may have been entered or changed will not be retained in memory.

a code is entered, INTELIPORT acknowledges the command by sending either an acceptance (valid code) tone or a rejection (invalid code) tone (see Table 1).

Operating Levels

3.11 The operating levels for INTELIPORT are factory-set for a -4.0dBm at the 2W RCV OUT port, 0.0dBm at the 2W XMT IN port, and 0.0dBm at the 4W XMT OUT port. If a level other than factory-set levels are required, the STC can remotely set (using the DTMF command method only) each port for the required level within the range of +7dBm and -16dBm. Any level attempted outside this range will be recognized as an invalid level causing INTELIPORT to send the rejection tone.

Entering Levels (DTMF-Controlled Only)

3.12 Levels are entered by first accessing the port to be set (#1 for RCV OUT, #2 for XMT IN, or #3 for XMT OUT), then entering the required level using a 3-digit numerical code in the form of DTMF commands. Please note that while operating in the normal mode of operation, INTELIPORT responds with a BEEP indicating a valid command following the DTMF command "#1", "#2", and "#3" and with another BEEP after a valid 3-digit numerical code (see paragraph 3.13) is entered. While operating in the terminal mode of operation, INTELIPORT responds with steady 1004Hz but only after a valid 3-digit numerical code is entered. NOTE: STC has 15 seconds in which to complete the level entering sequence for each port. If not completed in this time frame, INTELIPORT returns to the command mode and the process will have to be repeated.

3.13 A negative level is represented by a 3-digit numerical code (e.g., 030 represents -3.0dBm). A positive level is represented by entering a "*" preceding the 3-digit numerical code (e.g., *070 represents +7.0dBm). The first two digits of the 3-digit code represent the whole number while the third digit represents levels in tenths of a dB (e.g., the code "158" represents -15.8dBm; the code *065 represents +6.5dBm).

3.14 After entering a level, INTELIPORT sends a BEEP indicating it accepted the command (alternating 404/1004Hz if it did not accept the command), then returns to the command mode (interrupted 404Hz). While operating in the terminal mode and after the STC enters the level following the "#1", "#2", or "#3" command, INTELIPORT responds with steady 1004Hz indicating it accepted the command (steady 2804Hz if it did not accept the command), then returns to command mode (steady 404Hz).

NOTE

If an error is made while entering levels, the STC can re-enter the command and enter a valid level. The STC can also restore the factory-set levels by entering the DTMF command code "***".

Remote Alignment (DTMF Controlled)

NOTE

The installer can activate the Auto-align mode by pressing the front panel switch for more than five seconds. See paragraph 3.44 for detailed information.

3.15 From the DTM F-controlled command mode, the STC initiates remote (manual) alignment by entering the DTMF command "#4". Upon receiving "#4", INTELIPORT sends 1004Hz ($\pm 1\%$) to the STC. The STC should record the level received, then send 1004Hz to INTELIPORT. Upon receiving 1004Hz, INTELIPORT sends 2804Hz ($\pm 1\%$). The STC should record the level received, then send 2804Hz to INTELIPORT. Upon receiving 2804Hz, INTELIPORT sends 404Hz ($\pm 1\%$). The STC should record the level received, then send 404Hz to INTELIPORT. Upon receiving 404Hz, INTELIPORT sends a final tone of 1804Hz ($\pm 1.5\%$) for 60 seconds. The STC should record the level received, then has the option of sending 1804Hz within the 60-second time frame or ignoring the tone.

3.16 If the STC sends 1804Hz within the 60 second time frame, INTELIPORT aligns (to meet C5 conditioning) to four tones. If the STC does not send 1804Hz, the fourth tone times out after 60-seconds and INTELIPORT aligns (to meet C5) to three tones. The fourth tone (1804Hz) allows a more accurate equalization when interfacing long sections of loaded cable or a mixture of loaded and non-loaded cable. Please note that when aligning to 3-tones the 60second timeout feature can be bypassed by sending 1004Hz (more than five sec.), then removing tone.

3.17 Upon completing the alignment, INTELIPORT sends a ramp-up or ramp-down tone, then returns to the command mode. The ramp-up tone, consisting of a series of tones ranging from 400Hz to 2800Hz in ascending order, indicates alignment is within the parameters of C5 conditioning. The ramp-down tone, consisting of a series of tones ranging from 2800Hz to 400Hz in descending order, indicates alignment is not within the parameters of C5. Each tone in the ramp-up or ramp-down sequence is applied for approximately 1/4 second with the last tone (2800Hz in the ramp-up sequence; 400Hz in

the ramp-down sequence) being applied for approximately 15 seconds. At this time, the STC can either store and lock all information pertaining to level and alignment settings in memory and exit the command mode by sending the RELEASE code "##" or access other test modes (see Table 2) if further testing is desired.

NOTE

The STC can escape from alignment mode at any time by sending 2713Hz for more than five seconds. Upon detecting 2713Hz, INTELIPORT returns to normal (idle) operation. If the unit returns to idle while in the DTMF controlled method, any changes made will not be stored in memory and the levels previously stored in memory will be re-implemented. The only way to implement new parameters while in the DTMF controlled method is by entering the DTMF RELEASE command code, "##".

Quiet Term/Transponder (DTMF-Controlled)

3.18 The Quiet Term/Transponder mode allows the STC to remotely conduct noise and tone level measurements. The Quiet Term/Transponder is accessed while INELIPORT is in the command mode and the STC enters the DTMF command code "#5". When accessed, quiet termination is applied to the XMT IN port and the 2-wire port is disconnected from the customer's equipment. With the 2-wire port thus terminated, the STC can perform idle noise measurements of the 4-wire facility. Quiet termination remains in affect for 20 minutes or until one of the transponder codes or level verification test is entered. During this time, the STC can activate 4-tone auto-sweep or full-range transponder mode, or the level verification test mode.

4-Tone Auto Tranponder Mode (DTMF-Controlled)

3.19 The 4-tone auto transponder is used by the STC as a quick verification of transmission path levels. From quiet termination, the STC activates 4-tone auto by sending the DTMF command code "4*". Upon detecting "4*", INTELIPORT begins a sweep of tones at 404Hz, 1004Hz, 1804Hz, and 2804Hz ($\pm 3\%$), each for 15 seconds, and outputs the level of each tone at the XMT OUT port, then reapplies quiet termination. If a more detailed test is desired, the STC can activate the full-range transponder mode.

Full-Range Transponder Mode (DTMF-Controlled)

3.20 The full-range transponder is activated from the quiet termination mode by sending any 2-digit code representing frequencies from 300Hz to 3200Hz (see Table 3). After entering the desired 2-digit code, INTELIPORT returns the tone ($\pm 3\%$) associated with the code entered for 20 minutes or until a new code is entered. If the STC enters a new code, INTELIPORT responds and outputs the new tone associated with the code entered. Each tone transmitted by INTELIPORT is at the current transmit out

TLP as established during the level setting mode. Each time a new code is entered, the 20 minute timer is reset and allows the STC ample time to verify and record levels of each tone as required. INTELIPORT automatically times out and returns to command mode if no activity (i.e., send another test code tone, return to quiet termination, or return to the command mode) occurs within the 20 minute time frame. If release is desired before the 20 minutes, the STC can enter the DTMF command "#" which returns INTELIPORT to the command mode.

Level Verification (DTMF-Controlled Only)

3.21 While in the quiet term/transponder mode of operation, the STC can perform level verification

Table 3. Transponder Response Codes

ENTER CODE	SEND FREQUENCY	INTELIPORT RETURNS
03	304Hz	301Hz
04	404Hz	401HZ
05	504Hz	502Hz
06	604HZ	605HZ
07	704Hz	706Hz
08	804Hz	806HZ
09	904Hz	903Hz
10	1004Hz	1011Hz
11	1104Hz	1110Hz
12	1204Hz	1210Hz
13	1304Hz	1303Hz
14	1404Hz	1411Hz
15	1504Hz	1505Hz
16	1604Hz	1612Hz
17	1704Hz	1693Hz
18	1804Hz	1782Hz
19	1904Hz	1881Hz
20	2004Hz	1992Hz
21	2104Hz	2117Hz
22	2204Hz	2185Hz
23	2304Hz	2335Hz
24	2404Hz	2419Hz
25	2504Hz	2509Hz
26	2604Hz	2605HZ
27*	NA**	NA
28	2804Hz	2822HZ
29	2904HZ	2945Hz
30	3004Hz	3013Hz
31	3104Hz	3088HZ
32	3204Hz	3167Hz
00	NA	QUIET TERM

*Code 27 is detected as code to apply quiet termination

**2713Hz returns INTELIPORT to idle

tests of the 2W RCV OUT, 2W XMT IN, and 4W XMT OUT ports as required. This test is initiated when the STC sends any one of the codes under the Level Verification Test Mode outlined in Table 2. The code "*0" prompts INTELIPORT to send 1004Hz at 0dBm to establish a reference level at the 4W XMT OUT port. The code "*1" is then sent to verify the level of the 2W RCV OUT port. The STC then verifies the 2W XMT IN and 4W XMT OUT ports by sending the codes "*2" and "*3" respectively. Upon completion of the level verification tests, the STC must send the DTMF command "#" to return to the command mode.

3.22 In addition to the above, the STC can also perform THL measurements from the Quiet Term/ Transponder mode of operation. The code "1*" allows the STC to set up a THL (Transhybrid Loss) reference mark as INTELIPORT applies a short across the 2W port (simulating an off-hook (busy) condition). The code "2*" causes INTELIPORT to replace the short with a 600-Ohm, +2.15uF termination (simulating an on-hook condition) and allows for THL measurements. The code "3*" allows the STC to reconnect the 2W port to the customer's equipment and allows for THL measurements. The STC then returns to the command mode by entering the code "#".

Customer's Loopback Level Verification (DTMF-Controlled)

3.23 The customer's loopback level verification test is used to check the drop-side receive out level setting established during the set level ("#1") function. While in the command mode, the STC initiates this test by sending the DTMF code "#6". Upon detecting "#6", INTELIPORT returns the accepted command tone (BEEP in the normal mode; steady 1004Hz in the terminal mode). INTELIPORT sets the LPBK GAIN/LOSS circuit to 0dB and loops the RCV OUT port to the XMT OUT port. The STC then sends 1004Hz at 0dBm to verify the RCV OUT level. To exit this mode, the STC must enter the DTMF command code "#" to return to the command mode.

Signaling Test Mode (DTMF-Controlled Only)

3.24 The signaling test mode allows the STC to verify busy (off-hook) and idle (on-hook) conditions. To access the signaling test mode, the STC enters the DTMF command code "#7" while in the command mode. Upon detecting "#7", INTELIPORT returns the accepted command tone (BEEP in the normal mode; steady 1004Hz in the terminal mode). The STC then enters a digit "1". Upon detecting the digit "1", INTELIPORT applies a short across the 2-wire port to provide a THL (Transhybrid Loss) ref-

erence mark and simulates a loop closure (busy or off hook) condition. Upon completing this test, the STC then enters a digit "2". INTELIPORT replaces the short with a 600/900 ohm, +2.16uF termination for THL measurements and simulates a loop open (idle or on-hook) condition. Upon completing this test, the STC sends a digit "4". INTELIPORT reconnects the 2-wire port to the customer's equipment and provides for THL measurements to the demarcation. Each function within the signaling test mode remains in effect for 20 minutes to allow the STC ample time to perform each test. To release INTELIPORT from the signaling test mode, the STC can allow INTELIPORT to time out automatically or the STC can enter the DTMF command "#", either of which return INTELIPORT to the command mode.

SX-To-A&B NORM/REV

3.25 The transformers at the 4-wire ports are center tapped to provide simplex leads, available at the card-edge connector as SXT and SXR (pins 43 and 9 respectively), that can be used for sealing current or dc signaling applications. When the 2-wire port is optioned for a capacitive termination, the SXT and SXR leads are internally connected to the 2-wire port's A&B leads to provide a metallic loop signaling continuity between the facility and the equipment. In the factory-set NORM mode, the SXR lead from the 4-wire facility is connected to the A lead on the 2-wire side. The SXT lead from the 4-wire facility is connected to the B lead on the 2-wire side. These connections can be reversed remotely by the STC for testing and maintenance or to correct a reversed condition at some other point in the circuit (NOTE: The SXT/SXR to A&B lead connection is broken when the 2-wire port is optioned for a purely resistive termination).

SX-To-A&B NORM/REV Toggle (DTMF-Controlled)

3.26 From the DTMF-controlled command mode, the STC enters the DTMF code "#8" followed by a digit "1". This action sets the SX-To-A&B NORM/REV circuit for NORM (normal) conditions (SXR to A; SXT to B). Entering a digit "2", sets this circuit for REV (reversed) conditions (SXR to B; SXT to A). To release from this mode, the STC must send the DTMF command "#" to return to command mode.

Equal-Level Loopback

3.27 Equal-level loopback is accomplished by one of two ways: entering a DTMF command "#0" while in the command mode or by exiting the command mode and applying 2713Hz for more than two seconds, subsequently removing the tone.

3.28 While in equal-level loopback, the loopback circuit automatically inserts up to 24dB of gain/loss, based on the difference between the RCV OUT and XMT IN levels, to obtain an equal-level loopback condition towards the STC for verifying alignment settings and facility frequency response.

Loopback Release

3.29 Release is accomplished either automatically by a 20-minute timeout feature or by entering the DTMF command "#", either of which return INTELIPORT to the command mode. If loopback is initiated from an idle state (i.e., prior to entering the command mode), release is accomplished either automatically via a 20-minute timeout feature or by detection of a second 2713Hz tone for 0.9 seconds minimum, either of which return INTELIPORT to normal (idle) operation. The automatic feature ensures restoration of the transmission paths in the event the second tone is not sent.

Manual Loopback

3.30 Manual loopback can be accomplished any time the unit is idle (normal operating state) by applying a ground to the MNLB lead, pin 1. When loopback is manually activated, neither automatic timeout nor detection of 2713Hz will effect loopback release. Release of a manually activated loopback condition can only occur by removing the ground.

Release (DTMF-Controlled)

3.31 Upon entering all parameters of level and alignment settings, the STC must lock all information into INTELIPORT's non-volatile memory circuit. From the DTMF-controlled command mode, release is accomplished by entering the release code "###". If this code is not entered, any information pertaining to level and alignment settings will not be stored and INTELIPORT will reset to the levels previously stored in memory.

Command Mode Menu - Frequency Controlled Method

3.32 From the Frequency-controlled command mode menu, INTELIPORT's functions are initiated from the STC by sending the specific frequency that controls the function to be performed. When a frequency is sent, INTELIPORT acknowledges the command by sending either an acceptance tone or a rejection tone (see Table 1).

NOTE

Operating Levels

The operating levels for INTELIPORT are factory set for -4.0dBm at the 2W RCV OUT port, 0.0dBm at the 2W XMT IN port, and 0.0dBm at the 4W XMT OUT port. If a level other than factory-set levels are required, the STC can remotely set the levels via the DTMF-controlled method (see paragraph 3.11 through 3.14).

Remote Alignment (Frequency-Controlled)

3.33 From the command mode (interrupted 404Hz present) and using the Frequency-controlled command mode, the STC initiates remote alignment by sending 1004Hz. Upon receiving 1004Hz, INTELIPORT sends steady 1004Hz ($\pm 1\%$) to the STC. The STC should record the level received at 1004Hz from INTELIPORT. At this time, the STC can remove its 1004Hz to INTELIPORT. Upon detecting removal of 1004Hz, INTELIPORT sends 2804Hz ($\pm 1\%$). The STC should record the level received, then send 2804Hz to INTELIPORT. Upon receiving 2804Hz, INTELIPORT sends 404Hz ($\pm 1\%$). The STC should record the level received, then send 404Hz to INTELIPORT. Upon receiving 404Hz, INTELIPORT sends a final tone of 1804Hz ($\pm 1.5\%$) for 60 seconds. The STC should record the level received, then has the option of sending 1804Hz within the 60-second time frame or ignoring the tone.

3.34 If the STC sends 1804Hz within the 60 second time frame, INTELIPORT aligns (to meet C5 conditioning) to four tones. If the STC does not send 1804Hz, the fourth tone times out after 60 seconds and INTELIPORT aligns (to meet C5) to three tones. The fourth tone (1804Hz) allows a more accurate equalization when interfacing long sections of loaded cable or a mixture of loaded and non-loaded cable. Please note that when aligning to 3-tones the 60-second timeout feature can be bypassed by sending 1004Hz. Upon completing the alignment, INTELIPORT returns a tone indicating alignment is in or out of the parameters of C5 conditioning. A ramp-up tone, 404Hz to 2804Hz, indicates alignment is within C5 conditioning. A ramp-down tone, 2804Hz to 404Hz, indicates alignment is not within C5 conditioning. Upon completion of sending either the ramp-up or ramp-down tone (approx. 15 seconds), INTELIPORT automatically enters equal-level loopback to permit verification of alignment settings.

NOTE

The STC can escape from alignment mode at any time by sending 2713Hz for more than five seconds. Upon detecting 2713Hz, INTELIPORT returns to normal (idle) operation. If the unit returns to idle while in the frequency controlled method, any changes made will be stored in memory.

Equal-Level Loopback

3.35 While in equal-level loopback, the loopback circuit automatically inserts up to 24dB of gain/loss, based on the difference between the RCV OUT and XMT IN levels, to obtain an equal-level loopback condition towards the STC for verifying alignment settings and facility frequency response. While in loopback STC sends tones, one at a time, to INTELIPORT. The STC should record the level of each tone as it is looped back by INTELIPORT.

Loopback Release

3.36 Loopback release is accomplished either automatically by a 20-minute timeout feature or by sending 2713Hz for more than five seconds either of which return INTELIPORT to the command mode. If loopback is initiated from an idle state (i.e., prior to entering the command mode), release is accomplished either automatically via a 20-minute timeout feature or by detection of a second 2713Hz tone for 0.9 seconds minimum, either of which return INTELIPORT to normal (idle) operation. The automatic feature ensures restoration of the transmission paths in the event the second tone is not sent.

Manual Loopback

3.37 Manual loopback activation can be accomplished any time the unit is idle (normal operating state) by applying a ground to the MNLB lead, pin 1. When loopback is manually activated, neither automatic timeout nor detection of 2713Hz will effect loopback release. Release of a manually activated loopback condition can only occur by removing the ground.

Quiet Term/Transponder (Frequency-Controlled)

3.38 The Quiet Term/Transponder mode allows the STC to remotely conduct noise and tone level measurements. The Quiet Term/Transponder is accessed while in the command mode and the STC sends a frequency of 404Hz. When accessed, quiet termination is applied to the XMT IN port and the 2-wire port is disconnected from the customer's equipment. With the 2-wire port thus terminated, the STC can perform idle noise tests of the 4-wire facility. Quiet termination remains in affect for 20 minutes or until one of the transponder modes is initiated. During this time, the STC can activate the 4-tone automatic sweep or the manual full-range transponder mode.

4-Tone Auto Transponder Mode (Frequency-Control led)

3.39 The 4-tone auto transponder is used by the STC as a quick verification of transmission path levels. From quiet

termination, the STC activates 4-tone auto by sending 404Hz as the first tone following quiet termination. Upon detecting 404Hz INTELIPORT begins a sweep of tones at 404Hz 1004Hz, 1804Hz, and 2804Hz ($\pm 3\%$), each for 15 seconds, and outputs the level of each tone at the XMT OUT port, then returns to idle. If a more detailed test is desired, the STC can activate the full-range transponder mode.

Full-Range Transponder Mode (Frequency-Control led)

3.40 The full-range transponder is activated from the quiet termination mode by sending any frequency from 300Hz to 3200Hz (see Table 3). After receiving a frequency, INTELIPORT returns the respective tone ($\pm 3\%$) associated with the frequency entered. When activated, the 20-minute timer is set to allow the STC ample time to verify and record levels of each tone as required. Each time a new frequency is sent, the 20-minute timer is reset. INTELIPORT automatically times out and returns to command mode if no activity (i.e., send another test tone, return to quiet termination, or return to the command mode) occurs within the 20 minute time frame. If release is desired before the 20 minutes, the STC sends 2713Hz for more than five seconds which returns INTELIPORT to the command mode. The STC can then exit the command mode and return to normal (idle) operation by sending 2713Hz for more than five seconds or proceed with other tests (see Table 2) if further testing is desired.

SX-To-A&B NORM/REV

3.41 The transformers at the 4-wire ports are center tapped to provide simplex leads, available at the card-edge connector as SXT and SXR (pins 43 and 9 respectively), that can be used for sealing current or dc signaling applications. When the 2-wire port is optioned for a capacitive termination, the SXT and SXR leads are internally connected to the 2-wire port's A&B leads to provide a metallic loop signaling continuity between the facility and the equipment. In the factory-set NORM mode, the SXR lead from the 4-wire facility is connected to the A lead on the 2-wire side. The SXT lead from the 4-wire facility is connected to the B lead on the 2-wire side. These connections can be reversed remotely by the STC for testing and maintenance or to correct a reversed condition at some other point in the circuit (NOTE: The SXT/SXR to A&B lead connection is broken when the 2-wire port is optioned for a purely resistive termination).

SX-To-A&B NORM/REV Toggle (Frequency-Control led)

3.42 The SX-To-A&B lead NORM/REV circuit is

factory-set for NORM (normal). When using the frequency-controlled method, the SX-to-A&B lead NORM/REV feature is toggled to the opposite state when the STC sends 2804Hz while in the command mode. INTELIPORT returns to command mode after toggling.

Release

3.43 From the Frequency-controlled command mode, release is accomplished by sending 2713Hz for more than five seconds. If the release code is not sent, any information pertaining to level and alignment settings will not be stored and INTELIPORT will reset to the levels previously stored in memory.

Auto-Align (Frequency Or Switch-Activated Only)

3.44 Auto-align is used to align the IFT5616 and its counterpart at the distant end. Auto-align can be remotely activated by the STC while in the frequency controlled command mode by sending 1804Hz. Auto-align can be manually activated also by pressing and holding the front panel switch for more than five seconds.

3.45 Upon detecting 1804Hz from the STC, or the switch being pressed, INTELIPORT sends 2713Hz to the distant end for 60 seconds to put the distant end into the command mode. Upon detecting interrupted 404Hz from the distant end, tones of 1004, 2804, 404, and 1804Hz are transmitted and received between both units. Upon completion (approximately two minutes), both ends, through sending and receiving the appropriate tones, release and return to normal (idle) operation.

4. OPTIONS

4.01 INTELIPORT III (IFT5616) contains three option switches that are used to condition the module for proper application and operation. Refer to Figure 2 for the location and description of each option.

5. INSTALLTION

5.01 Upon receipt of the equipment, visually inspect it for signs of damage. If the equipment has been damaged in transit, immediately report the extent of damage to the transportation company and to Teltrend

Installer Connectlons

5.02 When installing the unit in Teltrend's prewired USA Mounting, connections are made via 25 pair cables mat-

ing to the appropriate 25-pair cable connectors located on the rear of the assembly. When installing the unit in Teltrend's unwired Type 550 mounting (Type 400 equiv.), connections are made by wire-wrapping the appropriate leads from the facility and equipment to the proper pins of the 56-pin connector in which the unit is installed. Pin identifications are listed in Table 5. Power requirement for operation is -42 to -56Vdc at 65mA, minimum during idle; 75mA maximum during testing and alignment.

6. TESTING AND ALIGNMENT

6.01 The testing and alignment procedures (shown in Table 5) may be performed after the unit is installed and power applied.

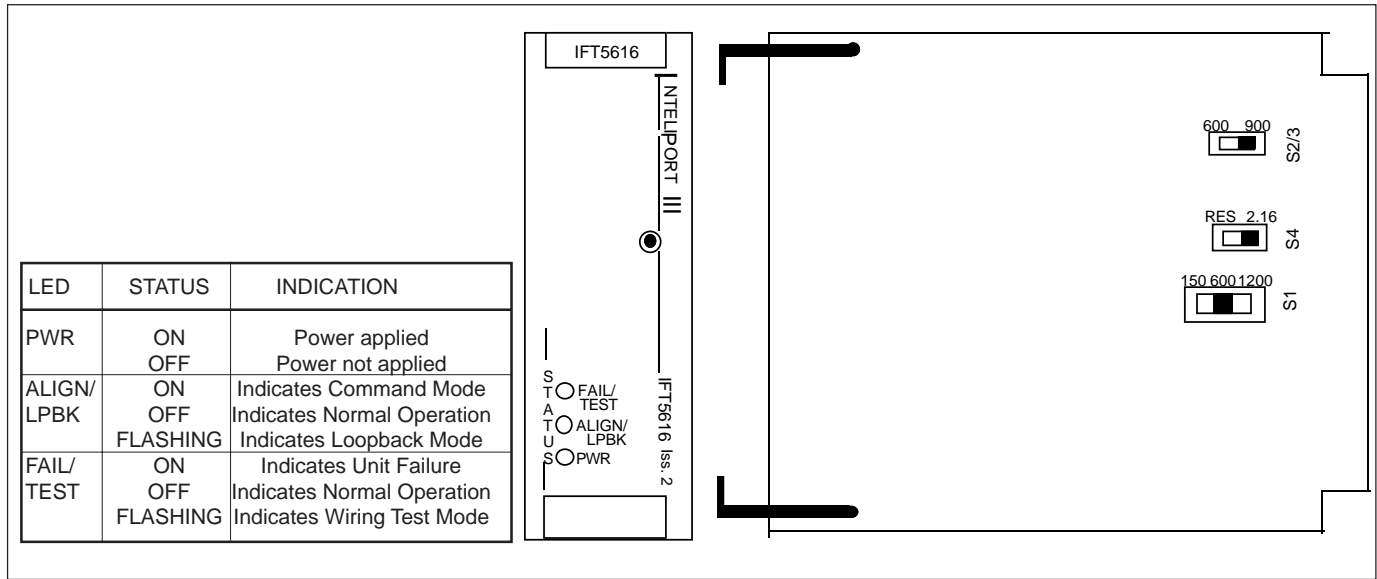
6.02 The procedures outlined in this practice are intended only to ascertain proper operation of the unit and, if problems should occur, to isolate those problems to the most probable area. These procedures are not designed to effect repairs or modifications. Tests or repairs beyond those outlined in these procedures are not recommended and may void the warranty.

6.03 If trouble is encountered, verify all installer connections, option switches, alignment settings via the loopback mode of operation, and that the unit is making a positive connection to the mounting assembly. If trouble persists, replace the unit and repeat the procedures outlined.

DESIGNATION		PIN
RT - 4W RCV IN Tip		7
RR - 4W RCV IN Ring		13
TT - 4W XMT OUT Tip	FACILITY	41
TR - 4W XMT OUT Ring		47
SXR - Simplex RCV		9
SXT - Simplex XMT		43
T - 2W Tip		55
R- 2W Ring	EQUIP.	49
A A-Lead		51, 53
B B-Lead		3
MLBG - Manual LoopbackGround		19
MNLB - Manual Loopback	MISC.	1
PWR - Power		35
GND - Ground		17

CAUTION

This product incorporates static sensitive components. Proper electrostatic discharge procedures must be followed.



OPTION	POSITION	FUNCTION
S1	150	Select when interfacing long nonloaded cable
	600	Select when interfacing short nonloaded cable
	1200	Select when interfacing loaded cable
S2/3	600	Select when interfacing 600-ohm equipment
	900	Select when interfacing 900-ohm equipment
S4	RES	Select for purely resistive 2-wire terminating interface impedance (disconnects A&B leads)
	2.16	Select for 2-wire terminating impedance in series with 2.16 (A&B leads connected to SXT and SXR for dc signaling applications)

Figure 2. INTELIPO RT III Option Diagram

6.04 If technical assistance is required, contact Teltrend's Customer Service Department by calling (630) 377-1700.

6.05 If a unit is in need of repair, call Teltrend for a Return Material Authorization (RMA) number and return the defective unit, freight prepaid, along with a brief description of the problem, to:

Teltrend Inc.
620 Stetson Ave.
St. Charles, IL 60174
ATTN: Repair and Return Dept.

6.06 As specified in our warranty, Teltrend will repair and return the unit at no charge to the customer providing the warranty date stamped on the unit has not expired. If an out-of-service situation exists, a replacement unit can be obtained; however, a purchase order number will be required to ensure return of the defective unit.

7. SPECIFICATIONS

RCV OUT And XMT IN/OUT Levels: Factory-set for -4.0dBm (2W RCV OUT), 0.0dBm (2W XMT IN), 0.0dBm (4W XMT OUT); Can be remotely set for any level (DTMF-controlled only) from +7 to -16dBm; Default code (DTMF only), "***"

Impedance: Facility-side, switch-selectable for 150, 600, or 1200 ohms; Equipment-side, switch-selectable 600/900 ohms purely resistive or in series with +2.16uF (switch-selectable)

Return Loss: ERL, greater than 26dB

Equalization: Automatically provides receive channel amplitude equalization (up to 15.3dB, re: 1004Hz) using 3 or 4-tones on loaded and/or nonloaded cable to meet C5 conditioning

TEST Mode: Activated by pressing front panel switch for less than five sec; when activated, continuous 1004Hz ($\pm 1\%$) is applied to the 2W port and interrupted 1004Hz ($\pm 1\%$) is applied to XMT OUT port; Release, switch pressed a second time, automatic release after one hour if switch not pressed a second time, or can be released by STC sending 2713Hz for more than five sec, 10 to 60 minutes after initial activation

Command Mode: Activation, must detect 2713Hz ($\pm 7\text{Hz}$) for more than 30 sec. to operate; $\pm 37\text{Hz}$ must not operate. INTELIPORT sends interrupted 404Hz ($\pm 1\%$) indicating command mode initiation

Loopback: Activated from idle state by sending 2713Hz ($\pm 7\text{Hz}$) for less than 30 sec.; Release, 20-minute automatic timeout ($\pm 5\%$) or by re-application of 2713Hz for 0.9 (± 0.3) sec.; Activated from command mode (DTMF controlled only) by entering "#6" (for Customer's RCV LVL) or "#0" (for Equal-Level); Release, 20 minute automatic timeout ($\pm 5\%$) or by entering the DTMF command "#" either of which return INTELIPORT to command mode; From the Frequency controlled method, INTELIPORT automatically enters equal-level loopback after alignment; Release, 20-minute automatic timeout ($\pm 5\%$) or by sending 2713Hz for more than five sec. returns INTELIPORT to command mode.

Loopback Detector Threshold Level: -24 (typically -30) to +3dBm

Loopback Gain/Loss: Automatically inserts up to 24dB for equal-level loopback transmission; 0dB for Customer's RCV Level loopback

Remote Alignment Mode: Activated from command mode with DTMF code "#4" (DTMF-controlled method) or with 1004Hz (Frequency-controlled method); Escape feature, activated by STC sending 2713Hz for more than five sec

Auto-Align Mode: Activated from Frequency controlled command mode with 1804Hz or can be activated by installer pressing and holding front panel switch for more than five seconds; Release, automatic or by sending

2713Hz (more than five sec.)

Quiet Term/Transponder Mode: Activated from command mode with DTMF code "#5" (DTMF-controlled method) or with 404Hz (Frequency-controlled method). When activated, quiet termination is applied and remains in effect for 20 min. or until transponder mode is selected; Automatic 4-Tone Sweep Transponder Mode, activated with DTMF "4*" (DTMF-controlled method) or with 404Hz (Frequency controlled method), Unit returns to quiet termination upon completion; Full-Range Transponder Mode, activated by 2-digit code (03 through 32) or by frequencies (from 300Hz to 3200Hz, see Table 3); Reissue, 20-min automatic timeout ($\pm 5\%$) or by entering "#" to return to command mode (DTMF controlled method) or 2713Hz to return to idle (Frequency controlled method); Release to idle, 2713Hz for more than five sec.

Harmonic Distortion: Less than 1%

Crosstalk: 75dB minimum from 300 to 3400Hz

Idle Noise: Less than 17dBmC0, measured into 600 ohms

Frequency Response: Receive path, +0.25 to -0.5dB (re: 1kHz) from 400 to 3400Hz (w/no equalization), -0.75dB to +0.25dB from 300Hz to 4000Hz; Transmit path, +0.25dB to -0.5dB from 300Hz to 3400Hz

SX-To-A&B NORM/REV: Initially set for NORM; Can be remotely toggled between NORM and REV by DTMF "#8" followed by digit "1" for NORM or digit "2" for REV; Release, DTMF "#" to return to command mode; Frequency controlled, toggled via 2804Hz, INTELIPORT returns to command mode after toggling

Operating Environment: Temperature, 32° to 122°F (0° to 50°C); Humidity, 0 to 95% (no condensation)

Power: -42 to -56Vdc, 65mA nominal (during idle); 75mA typical (during testing and alignment)

Mounting: Mounts in one position of a Teltrend Type 550 or USA Mounting Assembly (Type 400 equiv.)

Dimensions: Height, 5.6 in. (14.1 cm); width, 1.4 in. (3.6cm); depth, 5.9 in. (15cm)

Weight: Approx. 1 lb. (0.45kg)

ORDERING INFORMATION

Order in accordance with the following:

5616I2 IFT - INTELIPORT III (Issue 2)

Table 5. Testing and Alignment Procedures (DTMF-Controlled Method)

STEP	ACTION														
1.	<p>INSTALLER'S PROCEDURES</p> <p>Set all option switches to the appropriate position. Install unit and apply power. Verify PWR LED ON, and all other LEDs are OFF.</p> <p>NOTE: If FAIL/TEST LED is ON steady, replace unit and repeat Step 1. If FAIL/TEST LED is flashing, press switch on front-panel and proceed.</p>														
2.	<p style="text-align: center;">NOTICE</p> <p>INTELIPOINT places 1004Hz on the transmission pairs when the test mode is activated. Be sure INTELIPOINT is not connected to an in-service circuit where this tone may cause interference.</p> <p>TEST MODE</p> <p>Press front-panel switch (less than five sec.) Connect TMS with built-in speaker, or other suitable listening device (such as a hand-set or built-in) to:</p> <p>4W RCV IN pair facility-side cable connection. Verify continuous 1004Hz ($\pm 1\%$). 4W XMT OUT pair facility-side cable connection. Verify interrupted 1004Hz ($\pm 1\%$). 2W pair demarcation point. Verify continuous 1004Hz ($\pm 1\%$). When tones are verified, press front panel switch to end the test mode. NOTE: Test mode automatically times out after one hour if switch not pressed a second time, or can be released by STC by sending 2713Hz for more than five seconds, 10 to 60 minutes after initial activation.</p>														
3.	<p>SERVING TEST CENTER'S (STC) PROCEDURES</p> <p>Send 2713Hz (more than 30 sec.). INTELIPOINT returns interrupted 404Hz ($\pm 1\%$). Command mode activated. STC removes 2713Hz. NOTE: If STC does not have audible monitoring capability, send DTMF code "86" to enter terminal mode. INTELIPOINT's command mode tone changes to steady 404Hz.</p>														
4.	<p>SETTING LEVELS - DTMF Controlled Only (NOTE: Levels are factory set for -4.0dBm (RCVOUT); 0.0dBm (XMT IN); 0.0dBm (XMT OUT))</p> <table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: center; width: 50%;">NORMAL MODE</th> <th style="text-align: center; width: 50%;">TERMINAL MODE</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">Set "RCV OUT" Level</td> </tr> <tr> <td>Enter "#1". INTELIPOINT sends "BEEP". Enter level desired. (For negative level, enter 3-digit numerical code. For positive level enter "*" first, then 3-digit numerical code). INTELIPOINT sends "BEEP", then returns to command mode.</td> <td>Enter "#1" followed by desired level. (For negative level, enter 3-digit numerical code. For positive level, enter "*" first, then 3-digit numerical code). INTELIPOINT sends "1004Hz", then returns to command mode.</td> </tr> <tr> <td colspan="2" style="text-align: center;">Set "XMT IN" Level</td> </tr> <tr> <td>Enter "#2". INTELIPOINT sends "BEEP". Enter level desired. (Levels are entered as above). INTELIPOINT sends "BEEP", then returns to command mode.</td> <td>Enter "#2" followed by level desired. (Levels are entered as above). INTELIPOINT sends 1004Hz, then returns to command mode.</td> </tr> <tr> <td colspan="2" style="text-align: center;">Set "XMT OUT" Level</td> </tr> <tr> <td>Enter "#3". INTELIPOINT sends "BEEP". Enter level desired. (Levels are entered as above). INTELIPOINT sends "BEEP", then returns to command mode.</td> <td>Enter "#3" followed by desired level. (Levels are entered as above). INTELIPOINT sends "1004Hz", then returns to command mode.</td> </tr> </tbody> </table> <p>NOTE: If invalid level sent, INTELIPOINT sends rejection tone (see Table 1). If this happens, re-enter code, then valid level. STC can return to factory-set levels by entering code "****".</p>	NORMAL MODE	TERMINAL MODE	Set "RCV OUT" Level		Enter "#1". INTELIPOINT sends "BEEP". Enter level desired. (For negative level, enter 3-digit numerical code. For positive level enter "*" first, then 3-digit numerical code). INTELIPOINT sends "BEEP", then returns to command mode.	Enter "#1" followed by desired level. (For negative level, enter 3-digit numerical code. For positive level, enter "*" first, then 3-digit numerical code). INTELIPOINT sends "1004Hz", then returns to command mode.	Set "XMT IN" Level		Enter "#2". INTELIPOINT sends "BEEP". Enter level desired. (Levels are entered as above). INTELIPOINT sends "BEEP", then returns to command mode.	Enter "#2" followed by level desired. (Levels are entered as above). INTELIPOINT sends 1004Hz, then returns to command mode.	Set "XMT OUT" Level		Enter "#3". INTELIPOINT sends "BEEP". Enter level desired. (Levels are entered as above). INTELIPOINT sends "BEEP", then returns to command mode.	Enter "#3" followed by desired level. (Levels are entered as above). INTELIPOINT sends "1004Hz", then returns to command mode.
NORMAL MODE	TERMINAL MODE														
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Set "XMT OUT" Level															
Enter "#3". INTELIPOINT sends "BEEP". Enter level desired. (Levels are entered as above). INTELIPOINT sends "BEEP", then returns to command mode.	Enter "#3" followed by desired level. (Levels are entered as above). INTELIPOINT sends "1004Hz", then returns to command mode.														
5.	<p>Remote Alignment Mode (DTMF-Controlled method)</p> <p>Enter #4. INTELIPOINT sends 1004Hz ($\pm 1\%$). STC records level, then sends 1004Hz INTELIPOINT sends 2804Hz ($\pm 1\%$). STC records level, then sends 2804Hz to INTELIPOINT INTELIPOINT sends 404Hz ($\pm 1\%$). STC records level, then sends 404Hz to INTELIPOINT. INTELIPOINT sends 1804Hz ($\pm 1.5\%$) for 60 sec. STC records level than has option:</p> <ul style="list-style-type: none"> - Send 1804Hz. If tone sent within 60 sec., INTELIPOINT aligns to 4-tones, sends ramp-up or ramp down tone, then returns to command mode. - Do not send 1804Hz. If tone not sent in 60 sec., INTELIPOINT aligns to 3 tones, sends ramp up or ramp down tone, then returns to command mode. <p>NOTE: 60-sec. timer can be bypassed by sending 1004Hz Also note that STC can escape alignment by sending 2713Hz (more than five sec.).</p>														

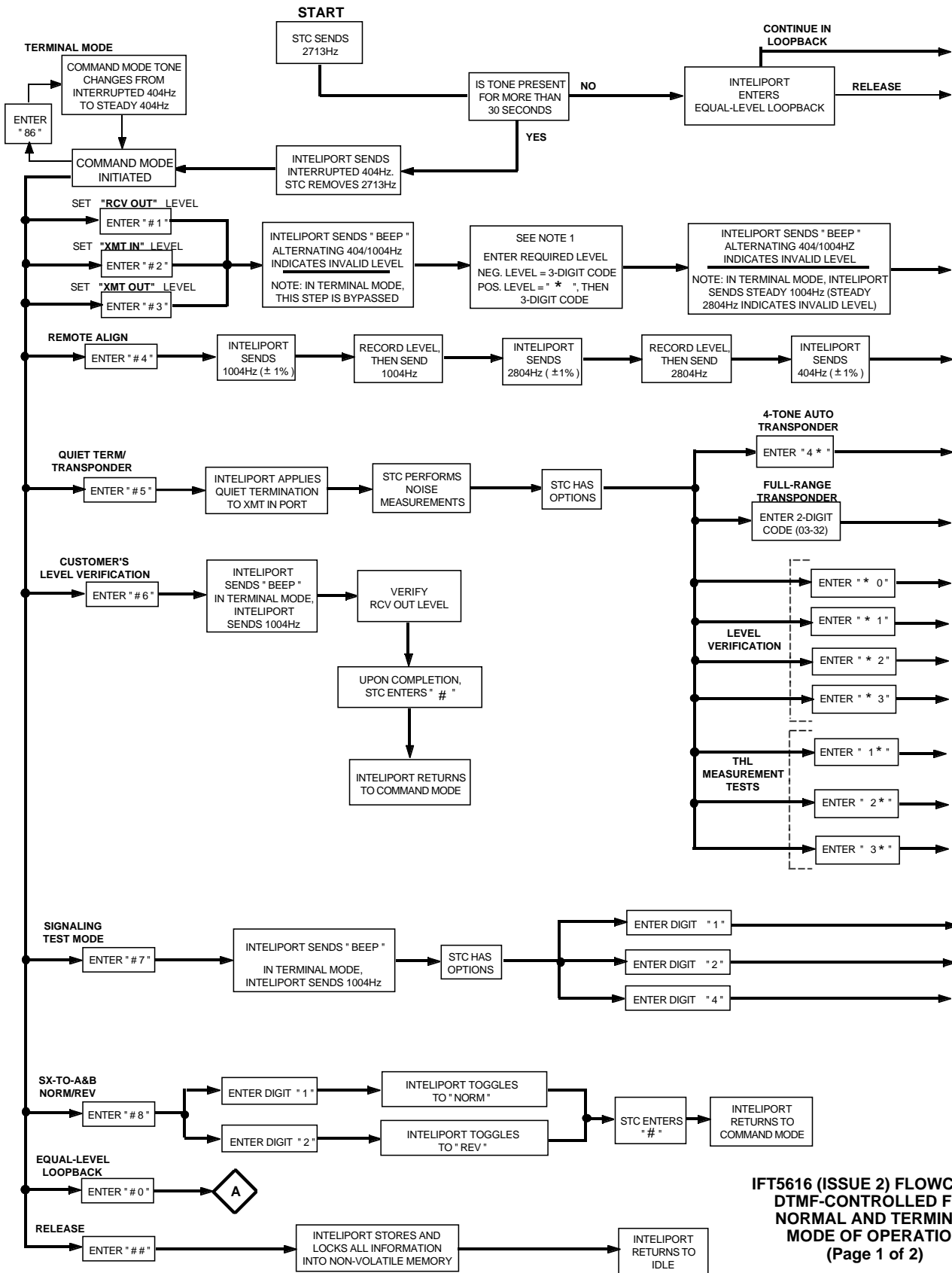
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Table 5. Testing and Alignment Procedures (DTMF-Controlled Method) Cont'd

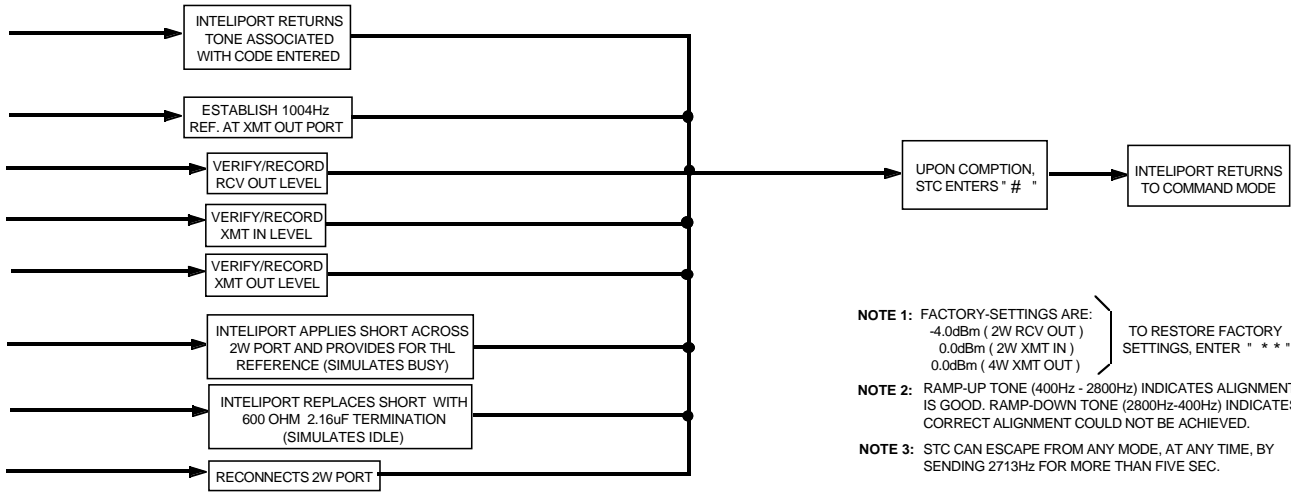
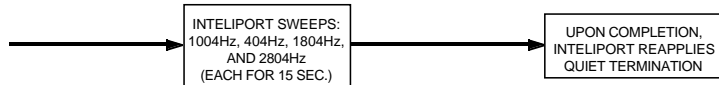
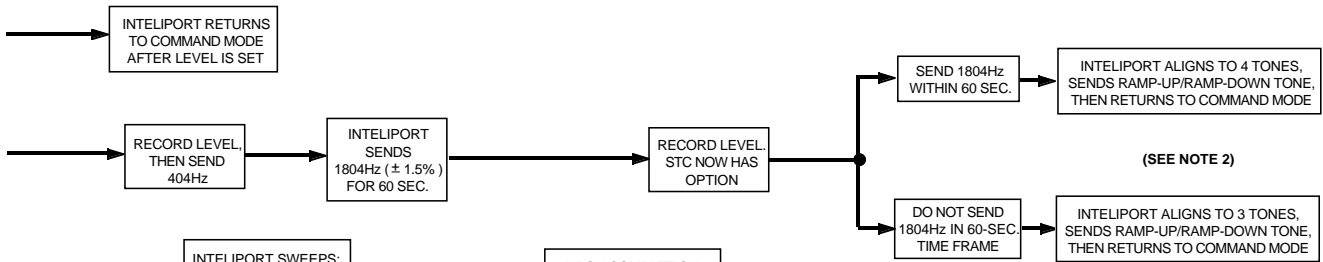
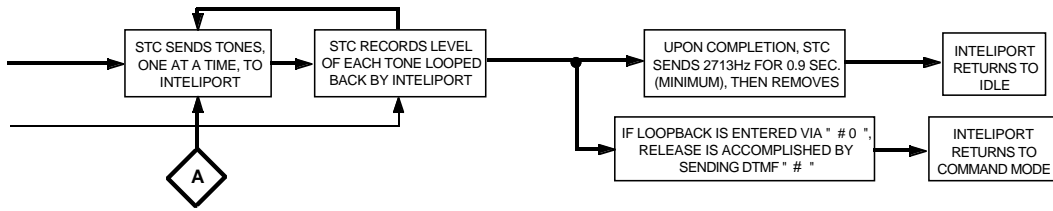
STEP	ACTION
6.	<p>QUIET TERM/TRANSPONDER (DTMF-Controlled Method)</p> <p>From command mode, enter "#5". INTELIPORT applies quiet termination to XMT IN port. STC performs noise measurements. NOTE: quiet term remains in effect for 20 min. or until one of the transponder modes or the level verification test mode is entered. If no tone sent in 20 min., INTELIPORT returns to idle. STC has options:</p> <ul style="list-style-type: none">- Enter 4-tone Auto Transponder by sending "4*". INTELIPORT begins sweep of tones at 404, 1004, 1804, and 2804Hz ($\pm 3\%$), then reapplies quiet termination.- Enter Full-Range Transponder by sending any 2-digit code (03 through 32) representing frequencies from 300Hz to 3200Hz INTELIPORT returns selected tone ($\pm 3\%$) associated with code entered (see Table 3). STC sends DTMF command "#" to return to command mode or "00" to return to quiet termination.- Enter Level Verification Test by entering:<ul style="list-style-type: none">"*0" - Establishes 1004Hz ref. at the XMT OUT port (Enter "#" to return to command mode)"*1" - Allows verification of RCV OUT level seeing (Enter "#" to return to command mode)"*2" - Allows verification of XMT IN level seeing (Enter "#" to return to command mode)"*3" - Allows verification of XMT OUT level seeing (Enter "#" to return to command mode) <p>THL Measurement Test</p> <p>From quiet termination, enter:</p> <ul style="list-style-type: none">"1*" (Sets up THL reference mark and applies short across 2W port - Verify)"2*" (Replaces short with 600-Ohm, +2.15uF termination - perform THL measurement)"3*" (Reconnects 2W port to equipment - Perform THL measurement)
7.	<p>Customer's Level Loopback - (DTMF Controlled Method Only)</p> <p>Enter "#6". This code sets the loopback circuit at 0dB (gain/loss) as it loops the RCV OUTport to the XMT IN port. This loopback test is primarily used to check the customer's (drop-side) level. STC must enter DTMF "#" to return to command mode.</p> <p>Equal-Level Loopback (DTMF Controlled Method)</p> <p>Enter DTMFcode "#0". This code sets INTELIPORT in the equal-level loopback mode by inserting up to 24dB of gain/loss as it loops the RCV OUT port to the XMT IN port to the facility. STC then sends tones and records level of each tone resumed by INTELIPORT. Loopback automatically times out after 20 minutes. If release is desired before 20 min. enter "#" to return to command mode.</p>
8.	<p>Signaling Test Mode (DTMF-Controlled Method Only)</p> <p>Enter code "#7". STC can enter</p> <ul style="list-style-type: none">Digit "1". INTELIPORT places short across 2W port for THL reference (simulates off-hook condition from demarc):Digit "2". INTELIPORT replaces short with 800/900 ohm, +2.1 6uF termination for TH L measurements (simulates on-hook condition from demarc):Digit "4". INTELIPORT reconnects 2W port to Customer's equipment for THL measurements <p>To return to command mode, enter DTMF command "#".</p>
9.	<p>SX-To-A&B NORM/REV (DTMF Controlled Method) NOTE: NORM/REV CIRCUIT IS INITIALLY SET FOR NORM</p> <p>STC enters "#8". STC then enters:</p> <ul style="list-style-type: none">Digit "1" for NORM.Digit "2". for REV. <p>STC then sends DTMF "#" to return to command mode.</p>
10.	<p>Release (DTMF-Controlled method)</p> <p>Upon completion, STC must enter RELEASE code (##) to save all information or changes in memory and exit the command mode. If the RELEASE code is not entered, INTELIPORT reverts to levels previously stored in memory.</p>

Table 5. Testing and Alignment Procedures (Frequency-Controlled Method)

STEP	ACTION
1.	<p>INSTALLER'S PROCEDURES</p> <p>Set all option switches to the appropriate position. Install unit and apply power. Verify PWR LED ON and all other LEDs are OFF.</p> <p>NOTE: If FAIL/TEST LED is ON steady, replace unit and repeat Step 1. If FAIL/TEST LED flashing, press switch on front panel and proceed.</p>
2.	<p>INTELIPOINT places 1004Hz on the transmission pairs when test mode is activated. Be sure INTELIPOINT is not connected to an in service circuit where this tone may cause interference.</p> <p>TEST MODE</p> <p>Press front panel switch (less than five sec.) ConnectTMS with built-in speaker, or other suitable listening device (such as a hand-set or built-in, to:</p> <p>4W RCV IN pair facility-side cable connection. Verify continuous 1004Hz ($\pm 1\%$).</p> <p>4W XMT OUT pair facility-side cable connection. Verify interrupted 1004Hz ($\pm 1\%$).</p> <p>2W pair demarcation point. Verify continuous 1004Hz ($\pm 1\%$).</p> <p>When tones are verified, press front panel switch to end test mode. NOTE: Test mode automatically times out after one hour, if switch not pressed a second time, or can be released by STC by sending 2713Hz for more than five seconds, 10 to 60 minutes after initial activation.</p>
3.	<p>SERVING TEST CENTER'S (STC'S) PROCEDURES</p> <p>Send 2713Hz (more than 30 sec.), then remove. INTELIPOINT returns interrupted 404Hz ($\pm 1\%$). Command mode initiated.</p> <p>SETTING LEVELS - DTMF controlled ONLY. Levels are factory set for -4.0dBm (RCV OUT), 0.0dBm (XMT IN) and 0.0dBm (XMT OUT). If levels other than factory-set level are required, see Step 4 of the DTM-controlled method of alignment.</p>
4.	<p>REMOTE ALIGNMENT (Frequency-Controlled Method)</p> <p>Send 1004Hz, INTELIPOINT sends 1004Hz ($\pm 1\%$). STC records level, then remove its 1004Hz to INTELIPOINT. INTELIPOINT sends 2804Hz ($\pm 1\%$). STC records level, then sends 2804Hz to INTELIPOINT. INTELIPOINT sends 404Hz ($\pm 1\%$). STC records level, then sends 404Hz to INTELIPOINT. INTELIPOINT sends 1804Hz ($\pm 1.5\%$) for 60 sec STC records level, then has option:</p> <ul style="list-style-type: none"> - Send 1804Hz If tone sent within 60 sec., INTELIPOINT aligns to 4-tones, sends ramp up/ramp-down tone, then enters loopback - Do not send 1804Hz If tone not sent in 60 sec., INTELIPOINT aligns to 3 tones, sends ramp up/ramp-down tone, then enters loopback. <p>NOTE: 60-sec. timer can be bypassed by sending 1004Hz. Also note that STC can escape alignment by sending 2713Hz (more than five sec.).</p>
5.	<p>LOOPBACK</p> <p>Equal-level loopback loops the RCV OUT port to the XMTOUT port. The loopbackcircuit inserts upto 24dB (gain/loss) based on the difference between the RCV OUT and XMT IN levels to obtain an equal-level loopback condition to the facility.</p> <p>While in loopback STC sends tones, one at a time, to INTELIPOINT. STC records level of each tone as it is looped back by INTELIPOINT. Loopback automatically times out after 20 min. If release is desired before the 20 min., STC sends 2713Hz (more than five sec.) to return to command mode.</p>
6.	<p>Quiet Term/Transponder Mode (Frequency-Controlled Method)</p> <p>From the command mode, send 404Hz INTELIPOINT applies quiet termination to XMT IN port. STC performs noise tests. NOTE: Quiet term remains in effect for 20 minutes or until one of the transponder modes is entered. If no tone sent in 20 min, INTELIPOINT automatically returns to idle.</p> <p>Transponder Mode. STC has option:</p> <ul style="list-style-type: none"> - Enter 4-tone Auto Sweep: This is done by sending 404Hz as the first tone while in quiet termination. INTELIPOINT begins sweep of tones at 404, 1004, 1804, and 2804Hz ($\pm 3\%$), each for 15 seconds, then reapplies quiet termination. - Enter Full-Range Transponder This is done by sending any frequency from 300Hz to 3200Hz (other than 404Hz as first tone) while in quiet termination. INTELIPOINT returns the same tone ($\pm 3\%$, see Table 3) for the same duration tone is received or 15 sec (whichever is longer). To release, STC sends 2713Hz for more than five sec. to return to the command mode.
7.	<p>SX To-A&B NORM/REV (Frequency-Controlled Method) NOTE: NORM/REV CIRCUIT IS INITIALLY SET FOR NORM</p> <p>From the command mode, STC sends 2804Hz. INTELIPOINT toggles from NORM to REV or REV to NORM and returns to command mods. If STC not reading correct state, send another 2804Hz.</p>
8.	<p>Release (Frequency Controlled Method)</p> <p>Upon completion, STC must send 2713Hz (more than 5 sec.). All information or changes are automatically stored in memory as INTELIPOINT exits the command mode.</p>



**IFT5616 (ISSUE 2) FLOWCHART
DTMF-CONTROLLED FOR
NORMAL AND TERMINAL
MODE OF OPERATION
(Page 1 of 2)**

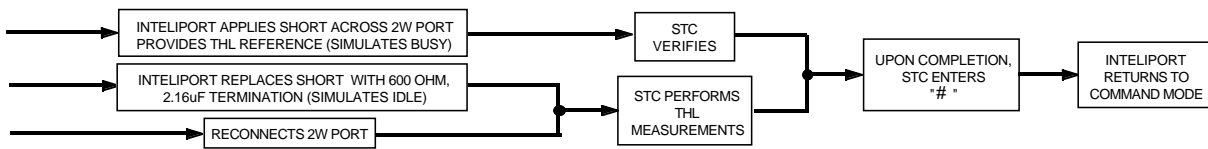


NOTE 1: FACTORY-SETTINGS ARE:
 -4.0dBm (2W RCV OUT)
 0.0dBm (2W XMT IN)
 0.0dBm (4W XMT OUT)

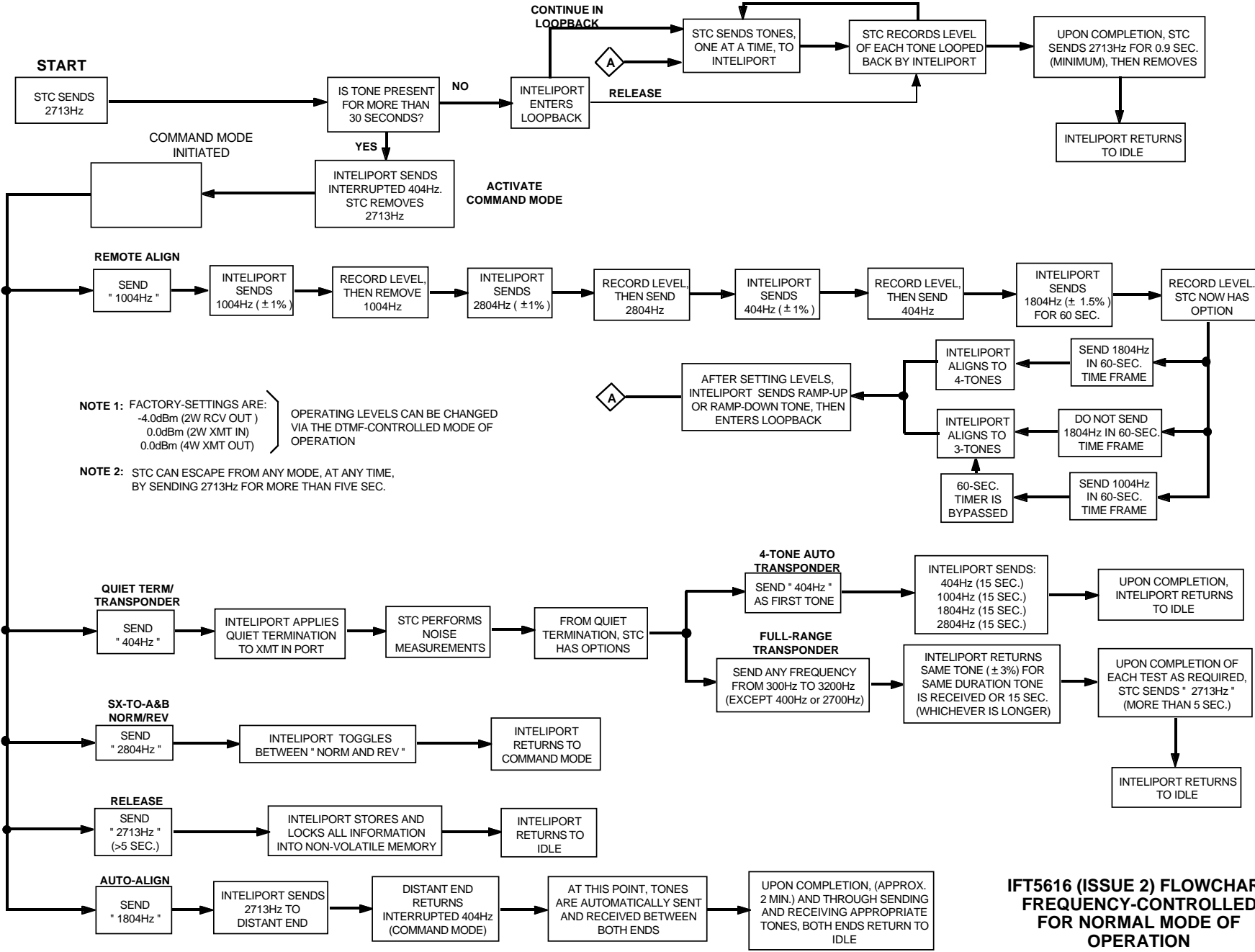
TO RESTORE FACTORY SETTINGS, ENTER " * * * "

NOTE 2: RAMP-UP TONE (400Hz - 2800Hz) INDICATES ALIGNMENT IS GOOD. RAMP-DOWN TONE (2800Hz-400Hz) INDICATES CORRECT ALIGNMENT COULD NOT BE ACHIEVED.

NOTE 3: STC CAN ESCAPE FROM ANY MODE, AT ANY TIME, BY SENDING 2713Hz FOR MORE THAN FIVE SEC.



**IFT5616 (ISSUE 2) FLOWCHART
 DTMF-CONTROLLED FOR
 NORMAL AND TERMINAL
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IFT5616 (ISSUE 2) FLOWCHART FREQUENCY-CONTROLLED FOR NORMAL MODE OF OPERATION

IFT5616 Quick Alignment (DTMF-Controlled Method)

A	B	C	D	E
FREQUENCY	ALIGNMENT LEVELS	LOOPBACK LEVELS	COL. C MINUS COL. B	TRANSPONDER RESPONSE (OPTIONAL)
1004				
2804				
404				
1804				

COL. D = CUSTOMER'S RECEIVE OUT LEVEL DEVIATION

- Send 2713Hz (more than 30 sec.), then remove. INTELIPORT sends interrupted 404Hz ($\pm 1\%$) at 0dBm (TLP). Command mode initiated.

NOTE: If STC does not have audible monitoring capability, enter DTMF code "86". Command mode tone changes to steady 404Hz.

Setting Levels - Initial alignment should be done with levels set for factory-settings. Factory-settings are -4.0dBm (2W RCV OUT); 0.0dBm (2W XMT IN); and 0.0dBm (4W XMT OUT). If levels other than factory-set levels are required, see Step 4 of the DTMF-controlled method Testing and Alignment Procedures.

- REMOTE ALIGNMENT:** Enter "#4". INTELIPORT sends 1004Hz ($\pm 1\%$). Record level in Col. B, then send 1004Hz.

INTELIPORT sends 2804Hz ($\pm 1\%$). Record level in Col. B, then send 2804Hz.

INTELIPORT sends 404Hz ($\pm 1\%$). Record level in Col. B, then send 404Hz

INTELIPORT sends 1804Hz ($\pm 1.5\%$) for 60 sec. Record level in Col. B, then:

-Send 1804Hz in 60-sec. time frame. INTELIPORT aligns to 4 tones, sends ramp-up/ramp-down tone and returns to command mode.

-Ignore 1804Hz. Tone times out. INTELIPORT aligns to 3 tones sends ramp-up/ramp-down tone, and returns to command mode.

Equal-Level Loopback

- Enter "#0". INTELIPORT in loopback STC sends tones, one at a time, to INTELIPORT. Record level of each tone returned in Col. C. STC then enters "#" to return to command mode.

RELEASE

- STC must send release command "##". INTELIPORT, updates non-volatile memory and returns to idle.
- Perform calculations for Col. D.

IFT5616 Quick Alignment (Frequency-Controlled Method)

A	B	C	D	E
FREQUENCY	ALIGNMENT LEVELS	LOOPBACK LEVELS	COL. C MINUS COL. B	TRANSPONDER RESPONSE (OPTIONAL)
1004				
2804				
404				
1804				

COL. D = CUSTOMERS RECEIVE OUT LEVEL DEVIATION

1. Send 2713Hz (more than 30 sec.), then remove. INTELIPORT sends interrupted 404Hz ($\pm 1\%$) at 0dBm (TLP). Command mode initiated.

NOTE: Initial alignment should be done with factory-set levels. Factory-settings are -4.0dBm (2W RCV OUT); 0.0dBm (2W XMT IN); and 0.0dBm (4W XMT OUT). If levels other than factory-set are required, see step 4 of the DTMF-controlled method Testing and Alignment Procedures.

2. **REMOTE ALIGNMENT:** Send 1004Hz. INTELIPORT sends 1004Hz ($\pm 1\%$). Record level in col. B, then remove 1004Hz to INTELIPORT.

INTELIPORT sends 2804Hz ($\pm 1\%$). Record level in Col. B, then send 2804Hz.

INTELIPORT sends 404Hz ($\pm 1\%$). Record level in Col. B, then send 404Hz

INTELIPORT sends 1804Hz ($\pm 1.5\%$) for 60 sec. Record level in Col. B, then:

-Send 1804Hz in 60-sec time frame. INTELIPORT aligns to 4 tones, sends ramp-up/ramp-down tone then enters loopback.

-Ignore 1804Hz. Tone times out. INTELIPORT aligns to 3 tones sends ramp-up/ramp-down tone, and then enters loopback.

Equal-Level Loopback

3. While in loopback. STC sends tones, one at a time, to INTELIPORT. Record level of each tone returned in Col. C. STC then sends 2713Hz for more than five sec. to return to idle and update non-volatile memory circuit.

RELEASE

4. STC must send 2713Hz for more than five sec. to release INTELIPORT, update the non-volatile memory and return to idle.
5. Perform calculations for Col. D.