

# PTS 160

## Remote Frequency, Signal Level and Control Mode Programming

The output frequency, output signal level or amplitude, and the mode of control (local or remote) are all remotely programmable through the Amphenol 57-type connector located on the rear panel. Table 1 lists the pin assignments for the 57-40500 connector. Output signal level programming is analog DC voltage level-controlled; all other programming on this connector is level (or state) triggered and employs TTL-level negative true logic.

The programming format for frequency control is parallel entry, 4 bit (1, 2, 4, 8 weighting) for all digits. No programming is performed on the 100 MHz digit; instead, the 10 MHz digit is programmed via a hexadecimal code to a digit between 0 and 15, corresponding to a setting of  $0 \times 10$  MHz through  $15 \times 10$  MHz.(i.e, 0 MHz through 150 MHz). For all other digits, 4 bit BCD coding is employed (1, 2, 4, 8 weighting, encoding digits 0 - 9 only). By default, all frequency programming pins are internally pulled to a high (false) state; to program a specific frequency the appropriate pins must be brought to the low state.

For the 0.1 Hz through 1 MHz digits, remote frequency programming changes result in an output signal at the new frequency (within 0.1 radian) within 5μseconds; for the 10 MHz and 100 MHz digits, frequency changes are effected within 20 μseconds.

Data latches are included which provide storage when a "latched" mode of operation is required. By default, all Latch Enable (LE) pins are internally pulled to a high (false) state, disabling the latches. To store remote frequency programming input, the LE pins must be brought to the low state. To accept new remote frequency programming input, the LE pins must be returned to the high state. To operate in a "transparent" (i.e., non-latched) mode, the LE pins may be left unconnected, or must be placed in the high state. A separate latch enable line is provided for each pair of digits so that serial operation with separate frequency programming data bytes is possible. Table 1 also lists the LE pin assignments.

Output level programming is by analog voltage, with a default output level set by a rear-panel accessible 10K ohm potentiometer (see Rear Panel Controls and Connectors, page 9). The default output level can be set to any valid level in the instrument's output range of +3 to +13 dBm. To enable remote amplitude programming, the user must provide a DC analog voltage from a low-impedance source on pin 22 of the remote interface, which will override the 10K ohm potentiometer default setting. The RMS output signal level is one-half (0.5) of the DC analog voltage present. The valid input voltage range is 0.6 - 2.0 VDC corresponding to an output signal level range of 0.3 - 1.0 Vrms into 50 ohms (+3 - +13 dBm).

The mode of frequency control, local or remote, is remotely programmable through the Remote Enable pin 42. By default this pin is internally pulled to a high (false) state; to enable the remote mode pin 42 must be brought to a low (true) state. If it is desired to go to remote frequency programming, but to do this under local control, a switch should be installed between pin 42 and ground.

## **Parallel Entry Board PE-1121**

The PE-1121 board contains circuitry to interface remote programming signals for frequency, output signal level and control mode (remote or local) with the appropriate modules within the instrument. The board is mounted to the rear of the unit, and is directly connected with an Amphenol 57-type input connector. Table 1 lists pin assignments for the 57-40500 connector.

All functions connect directly to 74-type ICs, and use TTL level, negative true logic. By default, all logic control pins are internally pulled to a *high* (false) state. The programming format for frequency control is parallel entry 4 bit BCD (1, 2, 4, 8 weighting) for each digit. 74HCT533 latches provide storage when a *latched* mode of operation is desired. To store remote frequency programming input, the Latch Enable pins must be brought to the *low* state. The output signal level is remotely controlled through a DC analog voltage on pin 22, with the RMS output voltage (into 50 ohm) set at one-half (0.5) the DC level. The remote/local mode is remotely programmed through pin 42. With reference to Figure 8, U6 is used to control a switch consisting of two transistors. U6 accepts the remote enable signal, which is negative true. In the local mode, latches are set to the *off* (third) state, and 5.1V is supplied to the front panel.

**TABLE 1: PTS 160 REMOTE FREQUENCY, SIGNAL LEVEL AND CONTROL MODE PROGRAMMING**

Amphenol 57-40500 - On Equipment  
Amphenol 57-30500 - Required to Control

Hex / BCD Weight:			1	2	4	8	Latch Enable
Digit			Pin Numbers				
10	MHz	(0-15, Hexadecimal valid)	15	16	40	41	23
1	MHz		17	18	19	20	24
100	KHz		1	2	26	27	24
10	KHz		3	4	28	29	25
1	KHz	(0 - 9 BCD valid;	5	6	30	31	25
100	Hz	10 - 15 invalid)	7	8	32	33	46
10	Hz		9	10	34	35	46
1	Hz		11	12	36	37	47
0.1	Hz		13	14	38	39	47

#### Frequency and Control Mode Programming

Frequency and Control Mode programming employ TTL-level, negative true logic.

Remote Enable = Pin 42

+5 - +5.4V = Pin 48 (100 mA max)

Ground = Pin 50

#### Signal Level Programming

Output signal level programming is through analog DC control voltage on Pin 22.

Remote Level = Pin 22

RMS output = 0.5 x Pin 22 DC control voltage, +0.6 - +2.0 VDC

Ground = Pin 21

**TABLE 2: PTS 160 PHASE ROTATION PROGRAMMING**

15 pin D-type female connector - On Equipment (OPTIONAL)

15 pin D-type male connector - Required to Control

BCD Weight:			1	2	4	8	Latch Enable
Phase Increment			Pin Numbers				
36.0°	(0 - 9 BCD valid)		9	10	11	12	14
3.60°	(0 - 9 BCD valid)		5	6	7	8	15
0.36°	(0 - 9 BCD valid)		1	2	3	4	15

Phase Rotation programming employs TTL-level, negative true logic.

Ground = Pin 13

#### TTL Levels

Low: +0.7V max

High: +2.0V min