

## LO PLUG-IN MODULE THEORY OF OPERATION

The LO plug-in module consists of a microwave synthesizer, microcontroller board, distribution board, and display board. It determines the microwave upconverter mixer input and transmitter output operating frequency. The operating frequency is determined by programming of the phase locked loop frequency synthesizer. Miniature DIP switches SW1 and SW2 set N counter and A counter PLL programming inputs. A 10 MHz input reference signal<sup>3</sup> determines the frequency stability of the PLL, see Figure 2 for numerical reference.



**Figure 1: LO plug-in module.**

The synthesizer module uses a microwave prescaler, dual modulus prescaler, and internal dividers to reduce the 10 MHz reference and microwave voltage controlled oscillator (VCO) frequencies to 25 kHz for the 09-049 series and 09-093 version; 125 KHz for the 09-073 series, 09-097 & 09-098 versions; or 200 KHz for the 09-092 version. These signals are applied to separate inputs of a phase detector. Input signals of equal phase generate no change in output. Should the VCO deviate in frequency, a phase shift is detected causing an integrator/low pass filter to generate a DC control voltage proportional to the offset frequency. This control voltage is applied to the microwave VCO to return it to the selected frequency.

The microwave local oscillator frequency is derived by adding (or subtracting in certain cases) the desired transmitter channel frequency to the incoming IF frequency:

**EXAMPLE:**

|                         |   |           |   |                        |
|-------------------------|---|-----------|---|------------------------|
| Visual Output Frequency | + | Visual IF | = | Microwave LO Frequency |
| 2501.25 MHz             | + | 45.75 MHz | = | 2547 MHz               |
| Aural Output Frequency  | + | Aural IF  | = | Microwave LO Frequency |
| 2505.75 MHz             | + | 41.25 MHz | = | 2547 MHz               |

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## FRONT AND REAR PANEL DESCRIPTIONS

### Front panel

Refer to Figure 1 for numerical references.

- 1) CHANNEL SELECTION INDICATOR: Not applicable in this model.
- 2) PROGRAMMING KEYPAD: Not applicable in this model.
- 3) LO SAMPLE: Not applicable in this model.
- 4) LO OUTPUT: Provides LO Drive to the upconverter plug-in module.
- 5) COMM PORT: Phone jack connector from the RS 485 Board used for communication to ComView Network. Not applicable in this model.
- 6) LED DISPLAY PANEL:
  - a) DC POWER: Indicates that +12V DC Power is present to the module.
    - i) GREEN = power present
    - ii) UNLIT = no power – denotes a problem
  - b) LO LEVEL: Not applicable in this model.
  - c) UHF LEVEL: Not applicable in this model.
  - d) REFERENCE: Not applicable in this model.
  - e) LO Ø LOCK: Indicates phase lock of the synthesizer or DRPLO module.
    - i) UNLIT = phase lock present
    - ii) RED = loss of phase lock
  - f) UHF Ø LOCK: Not applicable in this model.
- 7) HANDLE: Assists in removing module from sub chassis.
- 8) THUMBSCREWS: Secure module to the sub-chassis and provide a reliable ground connection; loosen to remove module for replacement or repair.

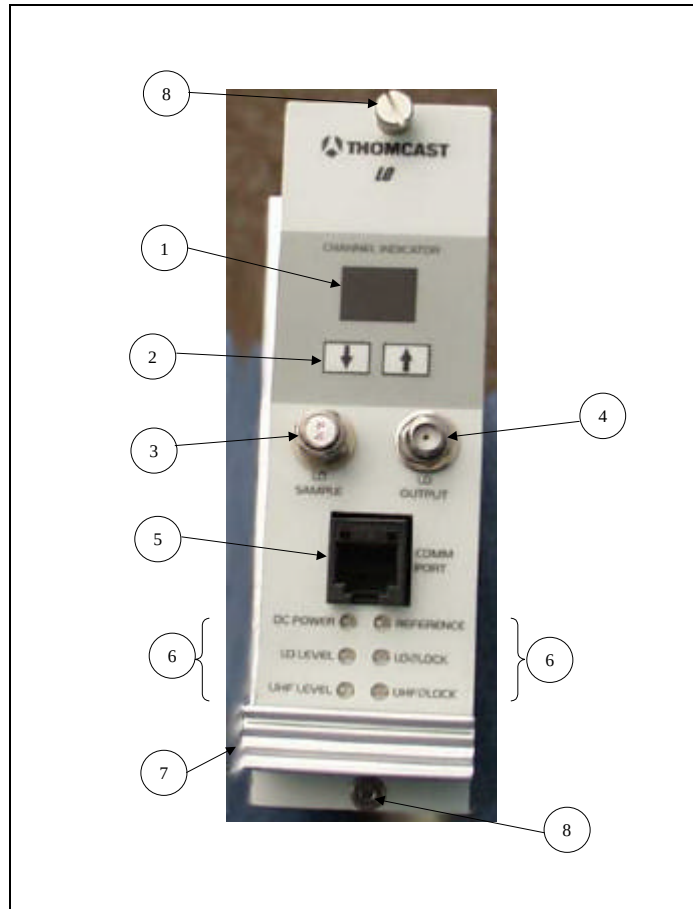


Figure 2: LO plug-in front panel.

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Refer to Figure 2 for numerical references.

- 1) 48 PIN DIN: Interface to the back plane, (all power, control and diagnostics)
- 2) GROUND / ALIGNMENT STUD: Ensures that proper ground is made prior to engaging the 48 pin DIN; also aids in the alignment of the module within the sub-chassis.
- 3) FREQ REFERENCE INPUT: Male 50Ω blind mate provides interface to the back plane and allows passage for the 10 MHz reference signal.
- 4) Not applicable in this model.
- 5) Not applicable in this model.
- 6) Not applicable in this model.

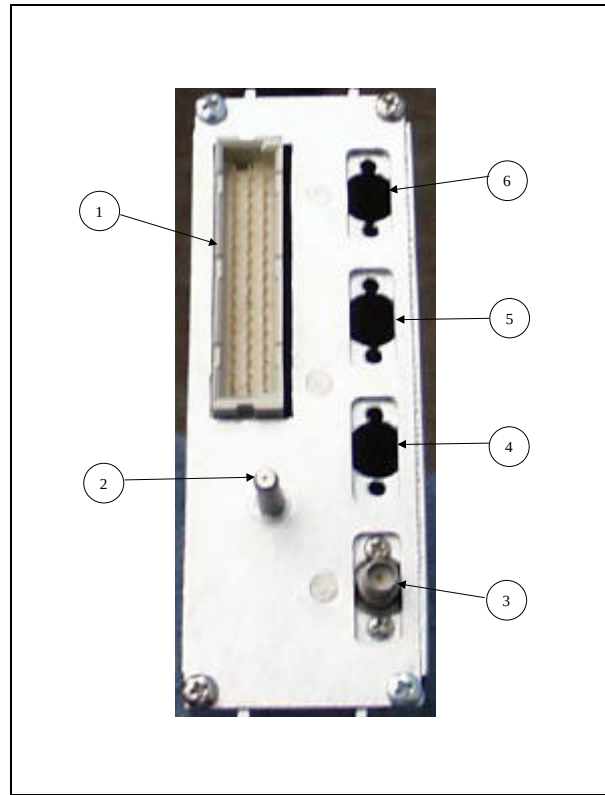


Figure 3: LO plug-in rear panel.

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