

Model 8140VT
VERSATAP™
INSTALLATION AND
OPERATION MANUAL

*95 Methodist Hill Drive
Rochester, NY 14623
Phone: US +1.585.321.5800
Fax: US +1.585.321.5219*



www.spectracomcorp.com
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1 Introduction

The Spectracom Model 8140VT VersaTap™ is a special-frequency line tap in the Spectracom Frequency Distribution Amplifier System. The VersaTap contains a crystal oscillator that is phase locked to an incoming 10 MHz reference. The output frequency is that of the selected crystal or a frequency that is derived by dividing the crystal frequency by a fixed integer between 1 and 8,192. The crystal frequency is between 4 MHz and 20 MHz.

1.1 Features

The VersaTap has two output BNC connectors. Between 500 Hz and 100 kHz Output A is a 50 ohm TTL source. It is a 50 ohm sine wave source between 100 kHz and 20 MHz.

Output B is a 50 ohm TTL source. The frequency of Output B is the same as the frequency of Output A.

Optionally, a lock/unlock signal can be provided on Output B. The option is selected by moving an internal jumper.

An LED indicator labeled OSC LOCK lights when the crystal oscillator is phased locked to the incoming reference. The indicator blinks if the input DC voltage is less than 8 VDC.

The 10 MHz reference may originate from any of the following Spectracom units:

Model 8130 Frequency Standard Oscillator with Option 03, Built-in Distribution Amplifier.

Model 8140 Frequency Distribution Amplifier with separate 10 MHz frequency source.

Model 8161 WWVB Receiver/Frequency Standard with Option 03, Built-in Distribution Amplifier.

Model 8164 Ageless™ Disciplined Oscillator with Option 03, Built-in Distribution Amplifier

Model 8195A Ageless™ Oscillator with Option 03, Built-in Distribution Amplifier

Model 8197 Ageless™ Master Oscillator with Option 03, Built-in Distribution Amplifier

1.2 Specifications

Specifications for the Model 8170VT VersaTap include those for unit inputs, outputs, the OSC LOCK LED, and physical specifications.

1.2.1 Reference Input

Signal:	10.0 MHz sinewave. Alternate input frequencies are available on a special order basis.
Level:	100 mV to 5.5V peak to peak
Impedance:	High impedance. To avoid reflections, the VersaTap must be properly terminated.
Connector:	BNC "T"

NOTE: The 10 MHz reference has a signal level between 100 millivolts and 5.5 volts peak-to-peak on a DC voltage of 8 to 12 VDC. The DC current requirement is 165 milliamps at +12 VDC with a 50 ohm load on Output A and Output B. Option 45, RS-422 output, requires 260 milliamps at 12 VDC with all outputs properly terminated.

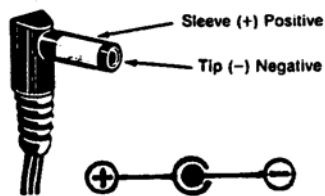
1.2.2 Power

VersaTaps with serial numbers 8140VT-1225 and above, or those shipped after 3/12/91, have a switching power connector. This connector allows the VersaTap to be powered from a distribution line or external power supply.

Distribution

Loading: Typically consumes 150 milliamps from distribution line. Equivalent to three (3) line tap loads.

External Power: Provided with Option 40; otherwise, select AC adapter with specifications listed herein.



Output Voltage:	9-12 Volts DC
Minimum Current:	300 mA
Connector:	Barrel type
Polarity:	Shell: positive Tip: negative.
Plug Size:	5.5 mm OD, 2.1 mm ID

1.2.3 Outputs

The VersaTap has two outputs, designated Output A and Output B.

1.2.3.1 Output A

Signal:	Sinewave if output frequency exceeds 56 kHz. Square wave if output frequency is less than 56 kHz.
Level:	600 mV rms
Impedance:	50 ohms
Connector:	BNC

1.2.3.2 Output B

Signal:	Square wave at specified frequency or alternately, a lock/unlock signal can be provided by moving internal jumper W6 to location W5. Output B is high when the VersaTap is phase locked to the incoming reference and low when it is not locked.
Level:	TTL compatible
Impedance:	50 ohms
Connector:	BNC

1.2.4 Indicators

The OSC LOCK LED will light when the VersaTap is locked to the incoming reference. The LED blinks if the DC input is low, which may cause a malfunction. The LED is off when the VersaTap is not locked to the incoming reference.

1.2.5 Physical

Size:	9.5L x 4.25W x 1.75H inches 240L x 110W x 45 H mm
Mounting pattern:	8.8 x 2.8 inches (225 x 70 mm)
Weight:	2 lbs (0.91 kg)
Temperature:	0 - 50°C
Label:	Serial number tag lists unit serial number, options, and input/output frequencies when applicable.

2 Principles of Operation

Refer to the VersaTap schematic in Figure 2-1 and to the component locations in Figure 2-2.

2.1 Input Section

Sheet 1 of Figure 2-1 is the input section of the VersaTap. The 10 MHz input reference is provided to J1 Pin1 and amplified by Q1, Q2, and Q3. The signal from Q3 is amplified to CMOS level by amplifier U1.

The signal from U1 Pin 8 is provided to DIVIDER A, which comprises U19, U20, and U21.

A 12 bit synchronous binary counter (U19, U20, and U21) divides the input reference. The divide ratio is selected by jumpers in J3. The counters count up to the maximum count and are loaded to a count determined by the jumpers. To divide by N, the counters are loaded to 4096-N. For example, to divide by 1250, the counter would be loaded with 4096-1250 or 2846 (BIE Hex). The least significant bit is J3 1-2, the most significant bit is J3 23-24. Pull up resistors are provided on the load inputs for U19, U20, and U21. The jumper configuration for loading 2846 (BIE Hex) is J3 1-2, 11-12, 13-14, 15-16, 21-22.

2.2 Phase Comparator, VCXO and Lock Detector

Sheet 2 of Figure 2-1 shows the phase comparator (U3) and voltage controlled crystal oscillator. The input signal F1 from Sheet 1 of Figure 2-1 is provided to U3 Pin 27. this signal is divided down to the phase comparison frequency, which is usually 1000 Hz. The divide number is selected by jumper J4. Table 2-1 lists the divide ratio for each of the eight possible jumper connections.

J4-5 to J4-6	J4-3 to J4-4	J4-1 to J4-2	Divide Ratio
IN	IN	IN	8
IN	IN	OUT	128
IN	OUT	IN	256
IN	OUT	OUT	512
OUT	IN	IN	1024
OUT	IN	OUT	2048
OUT	OUT	IN	2410
OUT	OUT	OUT	8192

Table 2-1: Divider B

The output from the crystal oscillator is amplified by U16A. For frequencies above 15.0 MHz, the oscillator output is divided by 2 by U17A and then provided to U3 Pin 1. For crystal oscillator frequencies below 15.0 MHz, the output from U16A is provided directly to U3 Pin 1.

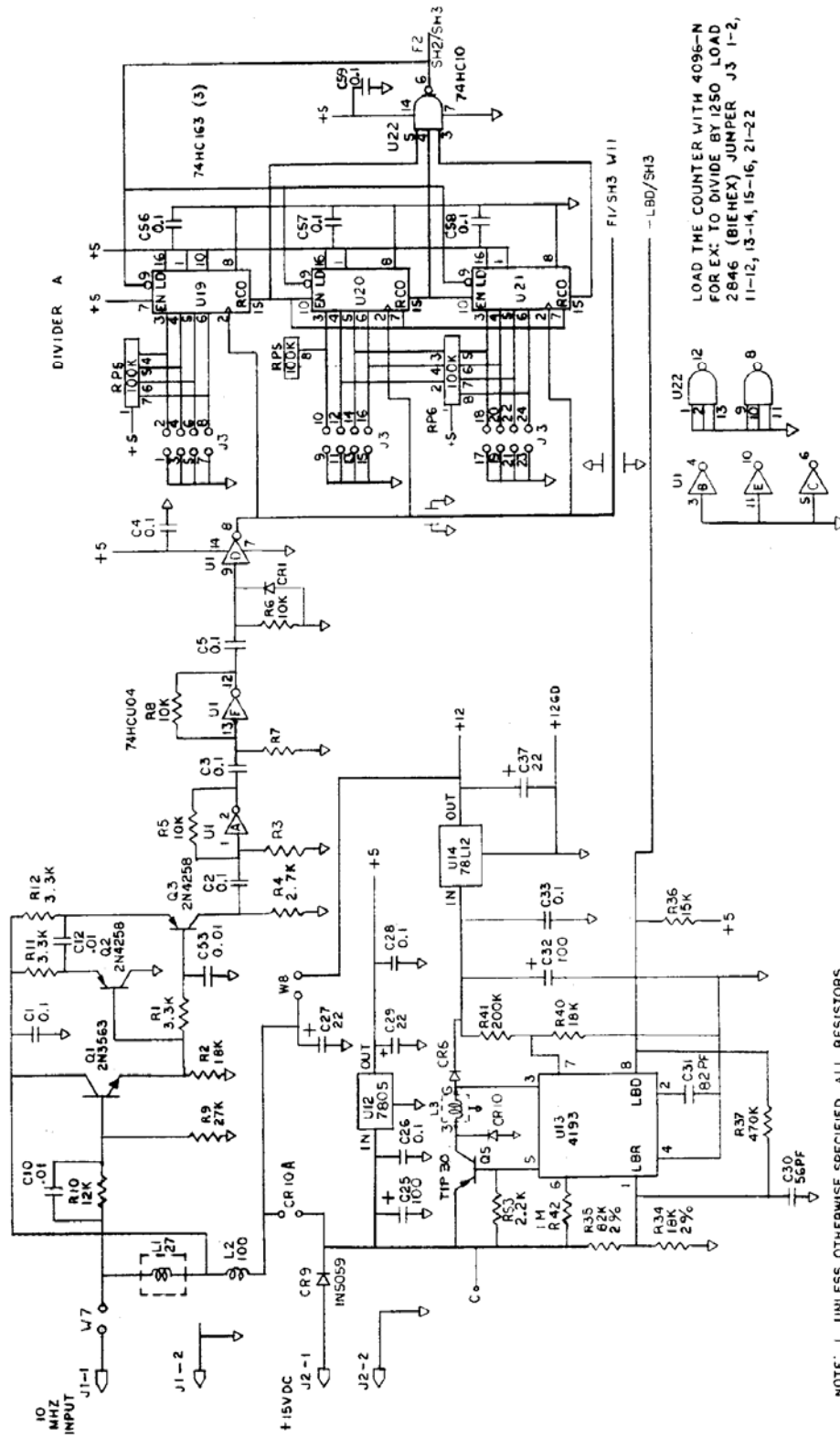


Figure 2-1: VersaTap Schematic, Sheet 1 of 3

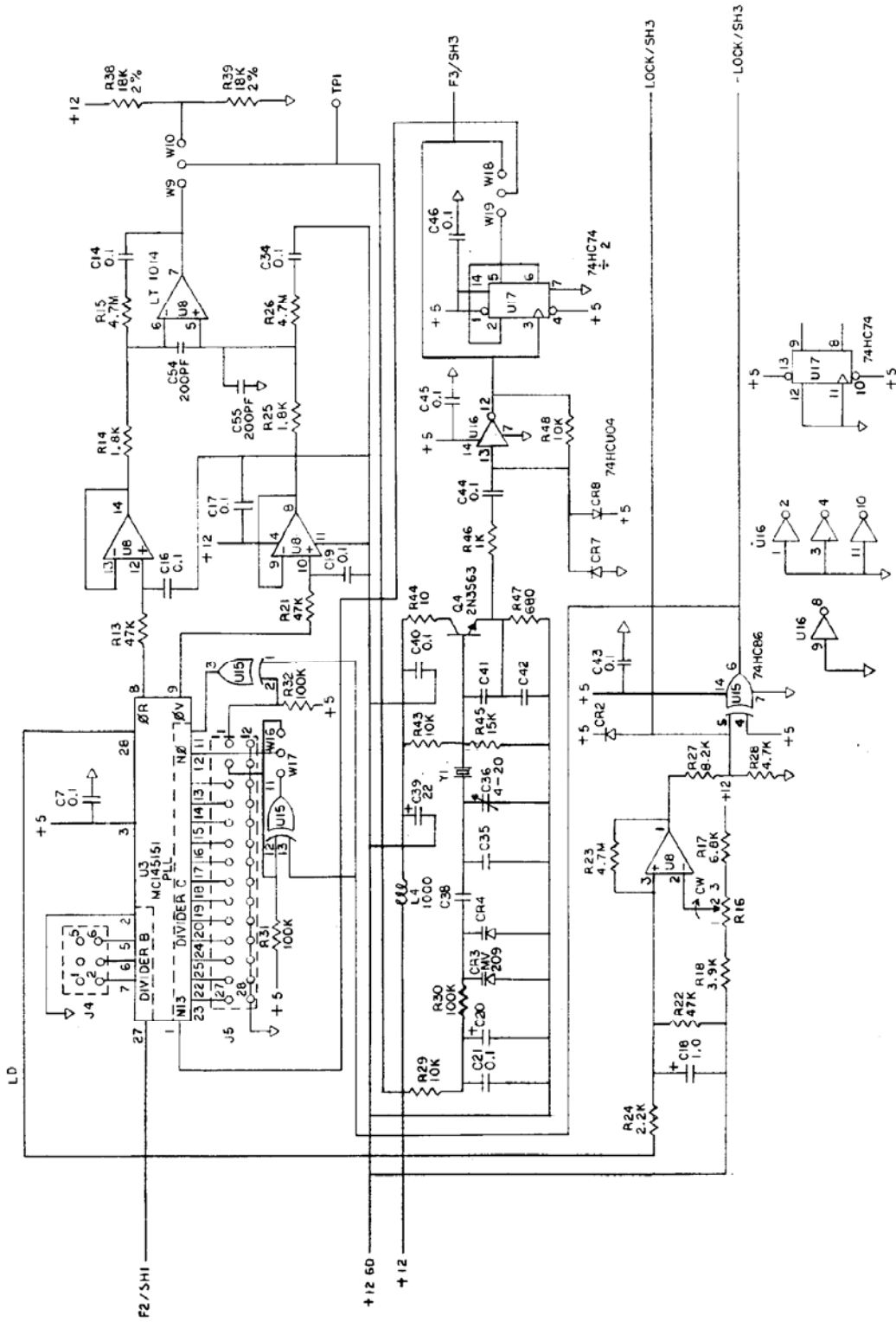


Figure 2-1: VersaTap Schematic, Sheet 2 of 3

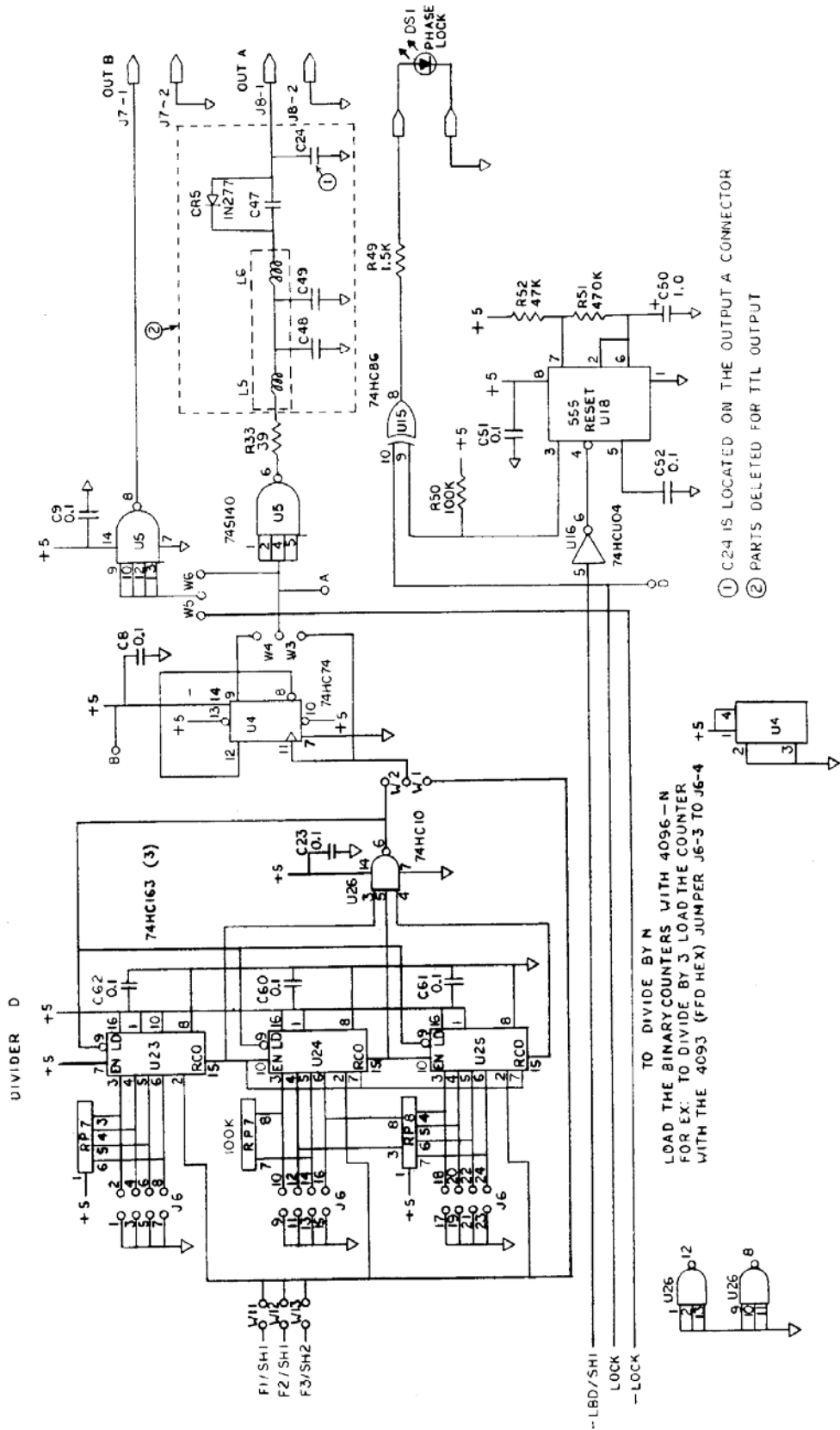


Figure 2-1: VersaTap Schematic, Sheet 3 of 3

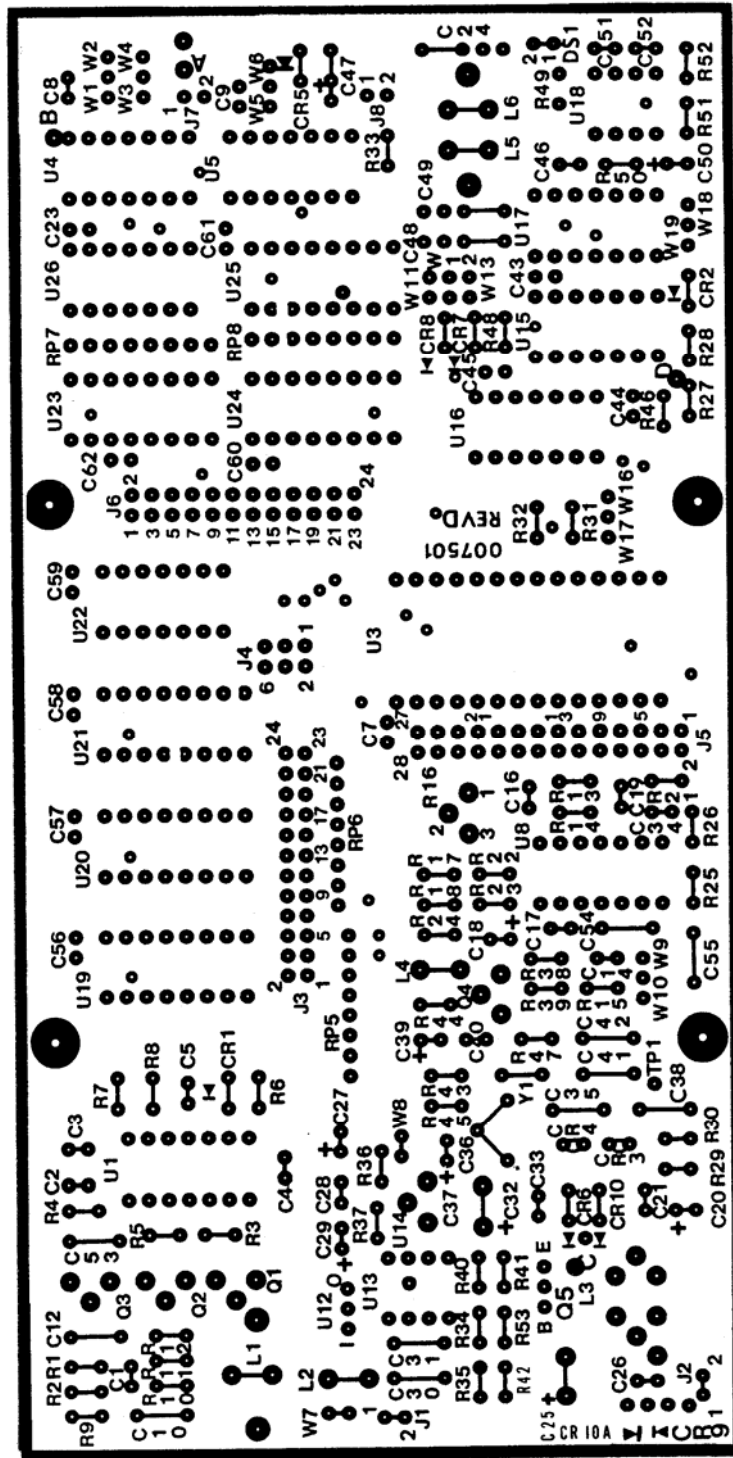


Figure 2-2: VersaTap Assembly

The internal divider of U3 is a down counter programmed by inputs N0 through N13. These inputs provide the data that is present into the counter when it reaches zero. N0 is the least significant bit, while N13 is the most significant bit.

To program a zero, a jumper is added. If the input is left open, a logical one is programmed.

The output from the phase comparator section of U3 is O/V and O/R.

If the crystal oscillator is high in frequency, error information is provided by O/V pulsing low (O/R remains high). If the crystal oscillator is low in frequency, O/R pulses low and O/V remains high. The outputs O/V and O/R are provided to low pass filters and the loop filter (U8B).

The error voltage from U8 Pin 7 is applied to the VCXO. The VCXO is a Colpitts oscillator with varicap control.

The loop lock indication, LD, is brought out on U3 Pin 28. It is a high level when the loop is in lock and pulses low when the loop is out of lock. This signal is filtered and fed into U8. The lock level threshold is adjusted using potentiometer R16.

The output from U15 Pin 6, -LOCK, is fed to jumper W5 located on Sheet 3 of Figure Figure 2-1. If jumper W5 is in, this signal is fed to Output B. This provides an external LOCK signal for remote sensing.

The LOCK signal from U15 Pin 4 is provided to U15 Pin 10, which drives the OSC LOCK LED.

Refer to Sheet 3 of Figure 2-1. U18 is a low frequency oscillator (1.3 Hz), whose output, U18 Pin 3, is provided to the exclusive OR GATE U15, Pin 9. If the oscillator is reset by the signal from U16 Pin 6, its output is low and the exclusive OR GATE does not invert the LOCK signal at U15 Pin 10. If the reset signal at U18 Pin 4 is high, the output signal U18 Pin 3 will go high and low, causing the OSC LOCK LED to blink.

2.3 Output Divider

Refer to sheet 3 of Figure 2-1. U23, U24, and U25 are the binary counters of the output divider (Divider D). The input signal enters through W11, W12, or W13. It may be jumpered directly to the output via W1 and W3, or it may be divided by two and coupled to the output if jumpers W1 and W4 are installed. Refer to *Input Section* for a description of the counter logic.

The output from the binary divider is fed to W2. If W3 is installed, it is provided directly to the output. If W4 is installed, it is divided by two and provided to the output.

The signal from U5 is filtered and provided to Output A. for frequencies below 100 kHz, the filter is not present and the TTL signal from U5 Pin 6 is provided to Output A.

The signal from U5 Pin 8 is a TTL signal that drives Output B. The source of the signal is from W5 or W6. If W5 is installed, the output is the LOCK/UNLOCK signal. If W6 is installed, the output is the frequency specified on the serial number tag of the unit. Model 8140VT units are shipped from the factory with jumper W6 installed.

2.4 Power Supply

The power supply is shown in Sheet 1 of Figure 2-1. The input signal from J1-1 is provided through L1, L2, and W14 to the +5 VDC linear voltage regulator. Inductors L1 and L2 are high impedances to the 10 MHz input reference and low impedance to the 12 VDC component.

The input DC voltage is coupled to U13, a switching voltage regulator. The output is +15 VDC. This signal is regulated down to +12 VDC. The +12 VDC is used by the crystal oscillator and loop amplifier, U8.

Input U13-1 measures the DC voltages from J1-1. If the input DC voltage drops below 8 volts, low battery detector U13-8 (LBD) will go low. The signal is provided to U18-4 on Sheet 3 of Figure 2-1 and will cause the OSC LOCK LED to blink.

3 Installation

Install and test your Spectracom equipment as described herein. In all cases, if any problems occur during installation and configuration, please contact Spectracom Technical Support at US +1 585.321.5800.

CAUTION:

Electronic equipment is sensitive to Electrostatic Discharge (ESD). Observe all ESD precautions and safeguards when handling Spectracom equipment.

NOTE: If equipment is returned to Spectracom, it must be shipped in its original packing material. Save all packaging material for this purpose.

3.1 Inventory

Before installing this equipment, please verify that all material ordered has been received. If there is a discrepancy, please contact Spectracom Customer Service at US 585.321.5800.

3.2 Inspection

Unpack the equipment and inspect it for damage. If any equipment has been damaged in transit, please contact Spectracom Customer Service at US 585.321.5800.

3.3 Physical Installation

Spectracom recommends that the VersaTap be mounted to a bench or nearby wall, using the mounting holes in the base of the unit.

A BNC tee connector is provided on the INPUT connector. Connect an RG-48/U coaxial cable from the distribution amplifier to the tee connector. Connect a second RG-58/U cable from the other side of the tee connector and continue on to the next unit.

NOTE: The last unit must be terminated with a 50 ohm DC isolated terminator.

Terminators are furnished with the base unit (Models 8130, 8140, 8161, 8164). Additional terminators may be ordered from Spectracom. Contact Customer Service at US +1.585.321.5800 for more information.

After the VersaTap is connected to a 10.0 MHz reference, the OSC LOCK LED will light. This should take less than 30 seconds to occur. If the OSC LOCK LED does not light, refer to *Performance Tests* for the appropriate testing procedure(s).

3.3.1 Stand-alone Installation

The VersaTap may be powered from an external source. This allows the VersaTap to be used with frequency sources other than the Spectracom distribution outputs. The available DC options are listed in Table 3-1.

OPTION	DESCRIPTION
40	115 VAC to 9 VDC AC Adapter
52	±12 VDC input
53	±24 VDC input
54	±48 VDC input

Table 3-1: Options

Refer to the Options listed in this manual for additional information. The VersaTap has a high input impedance. To avoid reflections, the cable from the frequency source must be terminated at the VersaTap input connector. Terminate the cable with a 50-ohm BNC terminator. illustrates a typical stand-alone installation. Refer to Figure 3-1.

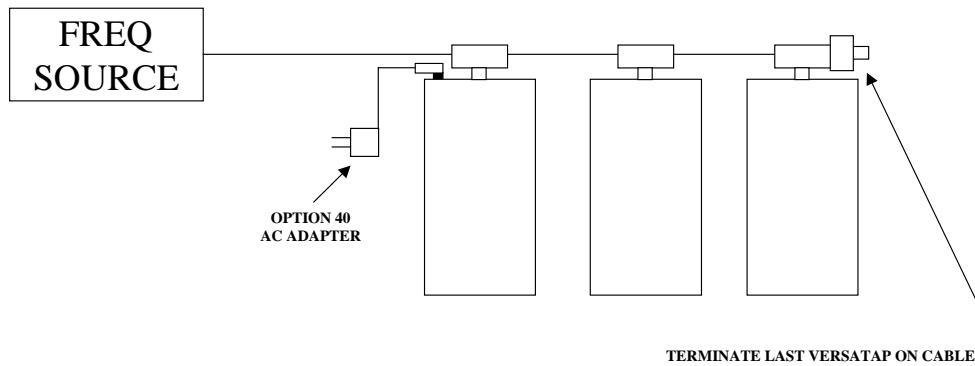


Figure 3-1: Stand-Alone Installation

4 Configuration

A typical system configuration is depicted in Figure 4-1. A standard frequency of 1, 5, or 10 MHz is provided to Distribution Amplifier. The Distribution Amplifier sends a 10 MHz standard frequency, riding on +12 VDC from four output ports. Line Taps or VersaTaps are located at remote locations.

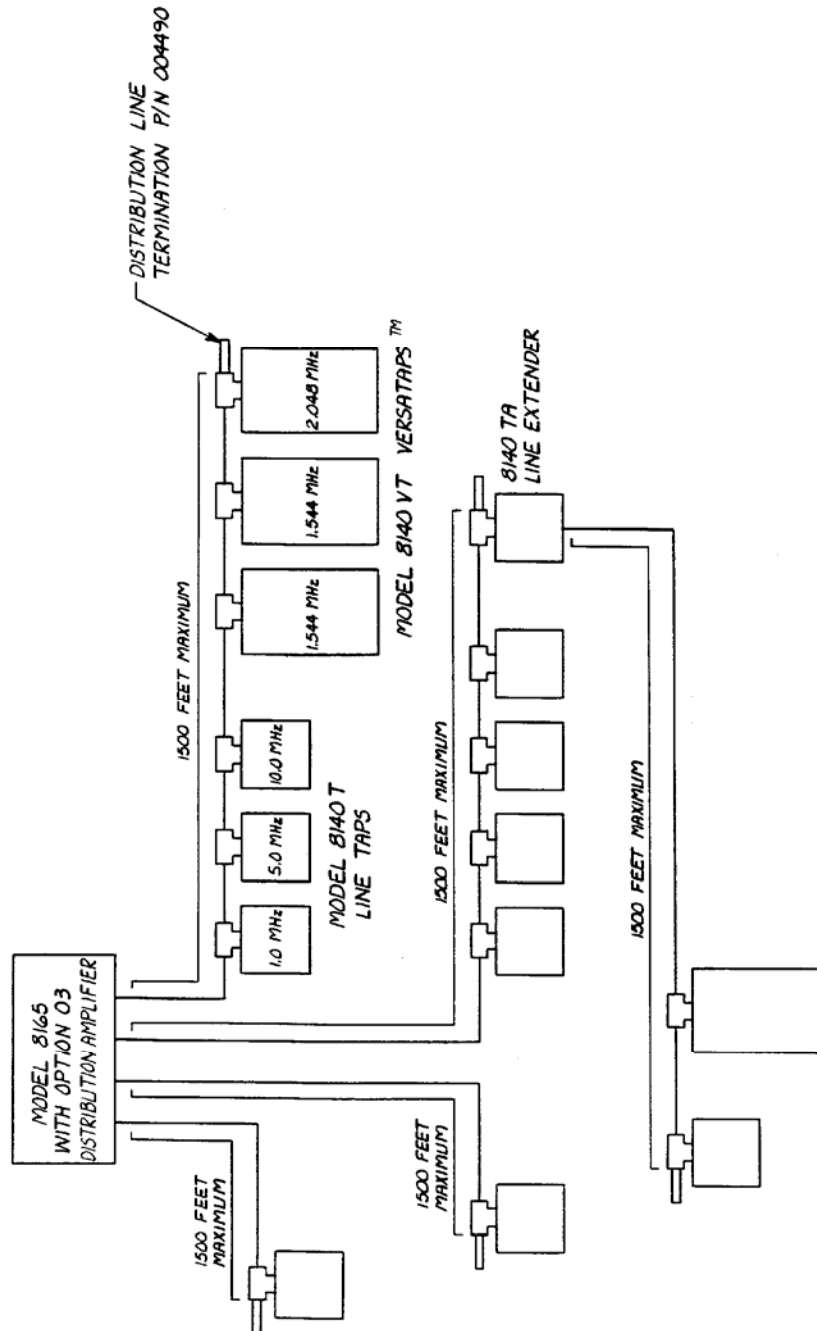


Figure 4-1: Typical System Configuration

The Model 8130 with Option 03, Built-in Distribution Amplifier, may be substituted for the Model 8140 Frequency Distribution Amplifier. For applications in which frequent calibration of the standard oscillator is undesirable, Spectracom recommends the Model 8164 Ageless™ Oscillator with Option 03, Built-in Distribution Amplifier. The model 8164 receives the signal from the national Bureau of Standards WWVB radio station and continuously calibrates its precise internal quartz oscillator. The 10 MHz standard frequency is added to +12 VDC and distributed from four output BNC connectors.

The Model 8161 WWVB Receiver/Frequency Standard is identical to the Model 8164 except that the internal oscillator of the 8161 must be manually calibrated against the received standard.

Using RG-58/U coaxial cable, one VersaTap may be located a maximum distance of 1500 feet from the distribution amplifier. This distance is limited by the attenuation characteristics of the cable (1.4 dB per 100 feet). For applications requiring connection distances of greater than 1500 feet, larger cable (such as RG-8) or a Model 8140TA Distribution Line Amplifier may be required.

The maximum number of Line Taps and VersaTaps that may be used with a distribution amplifier is constrained by the capacity of the power supply. A distribution amplifier will drive 25 standard standard Line Tap loads. The maximum number of standard VersaTaps recommended on a distribution amplifier is 8. The maximum number of VersaTaps with Option 45 recommended on a distribution amplifier is 5.

The average distance from a distribution amplifier at which taps can be located is limited by the voltage drop in the coaxial cable. Eight standard VersaTaps may be located an average distance of 200 feet from a distribution amplifier. Five VersaTaps with Option 45, RS-422 output, may be located an average distance of 250 feet from a distribution amplifier. Additional VersaTaps may be added by using Option 40, External DC Input.

A BNC tee connector is provided on the INPUT connector. Connect an RG-58/U coaxial cable from the distribution amplifier to the tee connector. Connect a second RG-58/U cable from the other side of the tee connector and continue on to the next unit. TERMINATE THE LAST UNIT WITH A 50-OHM DC ISOLATED TERMINATOR.

Terminators are furnished with the base unit, i.e. Models 8130, 8140, 8161, or 8164. Additional terminators may be ordered from Spectracom. The terminator part number is 004490.

A maximum of 25 line tap loads may be driven from one distribution amplifier. More than 25 loads is not permitted because of power supply limitations and impedance matching. Table 4-1 lists the equivalent number of loads and current each distribution device consumes. The distribution amplifier provides up to 1.2 amps total to the distribution network.

DEVICE	LOADS	CURRENT (mA)
8140T All Versions	1	45
8140TA	1	45
8140MT	3	150
8140VT Standard	3	150
8140VT w/Option 45	5	250
8140VT w/Option 48	4	200
8140VT w/Option 50	4	200
8140VT w/Option 58	4	200
8140VT w/Option 62	5	250
8140VT w/Option 66	5	250

Table 4-1: Line Tap Loads

If the desired distribution loading figure exceeds 25 line tap loads, Option 40, External Dc input, may be added to the VersaTap. Option 40 powers the VersaTap, reducing the equivalent line tap load to 1.

Using RG-58/U coaxial cable, one VersaTap may be located a maximum distance of 1500 feet from the distribution amplifier. This is limited by the attenuation characteristics of the cable (1.4 dB per 100 feet). For applications longer than 1500 feet, larger cable such as RG-8 or a Model 8140TA Distribution Line Amplifier may be used.

The average distance that taps can be located from a distribution amplifier is limited by the voltage drop in the coaxial cable. Eight standard VersaTaps may be located an average distance of 200 feet from a distribution amplifier. Five VersaTaps with Option 45, RS-422 output, may be located an average distance of 250 feet from a distribution amplifier.

4.1 Internal Jumpers

The Model 8140VT has two internal jumpers.

Jumper W9/W10: The normal operating position is W9. During calibration, the jumper is moved from location W9 to location W10.

Jumper W5/W6: The jumper is normally located in position W6. Output B then provides a TTL output signal of the same frequency as Output A. If the jumper is moved to location W5, Output B provides a LOCK/UNLOCK TTL level signal.

4.2 Adjustments

The crystal oscillator and lock detector levels may be adjusted.

4.2.1 Crystal Oscillator Adjustment

As the crystal ages, the control voltage to the VCXO will change to compensate for the aging process. To calibrate the VCXO, move the W9 jumper to location W10. Connect a counter to U16 Pin 12. Adjust trimmer capacitor C36 until the counter reads the frequency of the crystal, ± 10 Hz. Return the jumper from W10 to location W9 after the adjustment is complete.

4.2.2 Lock Detector Level Adjustment

Adjust potentiometer R16 for 4.35 ± 0.05 VDC at U8 Pin 2.

5 Performance Tests

The performance tests described in this manual are suitable for initial inspection, troubleshooting, and preventive maintenance. The tests are designed to verify that the Model 8140VT is performing to specifications. Perform the tests in the order they are listed in this manual.

Equipment	Recommended Model
Signal Generator	Marconi 2022
Power Supply, Variable, 0 to 12 VDC	Kikusui Model PWC 0620
Oscilloscope	Tektronix Model 455 or Model 2215
Multimeter	Fluke 75
50 ohm Terminator	
100 uh Choke	
0.1 uf Capacitor	

Table 5-1: Recommended VersaTap Test Equipment

Configure the test(s) as shown in Figure 5-1.

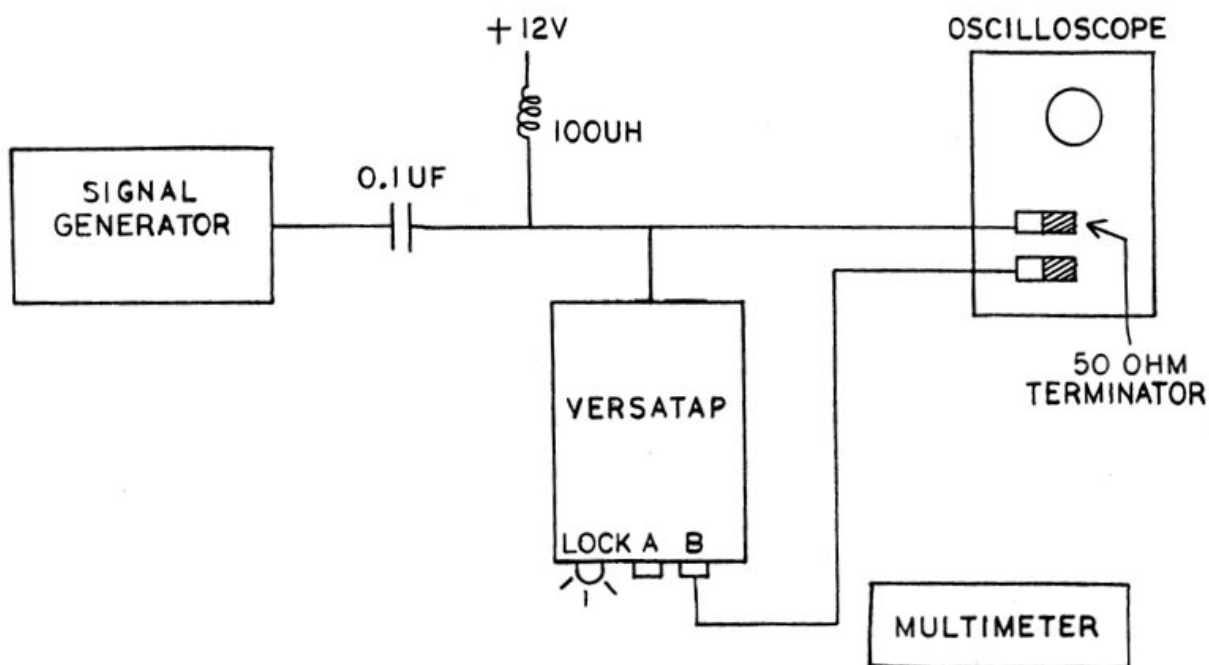


Figure 5-1: VersaTap Test Setup

5.1 Test 1 – DC Voltages

Measure the supply voltages at the following locations:

- U3 Pin 3: +5 volts (± 0.25)
- U8 Pin 4: +12 volts (± 0.5)

5.2 Test 2 – VCXO Alignment

Move jumper W9 to location W10. Using the oscilloscope, measure the signal at U16 Pin 12.

- U16 Pin 12: LOW (< 1.0 volt)
- U16 Pin 12: HIGH (> 4.0 volts)

Connect a counter to U16 Pin 12 and adjust trimmer C36 to the desired frequency.

- Crystal Oscillator Frequency (± 10 Hz)

Move the jumper from location W10 back to location W9 when testing is complete.

5.3 Test 3 – Lock Threshold

Measure the DC voltage at U8 Pin 2. Adjust R16 until the voltage is 4.35 ± 0.05 volts.

- U8 Pin 2 Threshold Voltage (4.35 ± 0.05 volts)

5.4 Test 4 – Input Sensitivity

Adjust the output of the signal generator until the input signal is 10.0 MHz, 100 millivolts peak-to-peak. The OSC LOCK LED should light.

- OSC LOCK LED Illuminated

5.5 Test 5 – Output Levels

Terminate Output A in 50 ohms. Output A is a sine wave, the amplitude of which is nominally 1.7 volts peak-to-peak for frequencies from 100 kHz to 20 MHz. For frequencies below 100 kHz, the output is a TTL signal.

- Output A (1.7 volts peak-to-peak)
- Output A, TTL LOW (< 0.8 volts)
- Output A, TTL HIGH (> 2.0 volts)

Terminate Output B in 50 ohms. The output is a TTL signal.

- Output B, TTL LOW (< 0.8 volts)
- OUTPUT B, TTL HIGH (> 2.0 volts)

6 Options

Several options are available for the Model 8140VT VersaTap.

6.1 Option 40 – External DC Input

This option makes it possible to use the VersaTap with any reference frequency or Spectracom products not equipped with Option 03, Built-in Distribution Amplifier. The external DC input option may also be used to increase the number of VersaTaps allowed per distribution amplifier. Power supply limitations of the distribution amplifier permit a maximum of eight standard VersaTaps or five Option 45 equipped VersaTaps. Units added above the maximum allowable number must be equipped with Option 40, External DC Input. Option 40 AC couples the input circuitry and therefore draws a negligible amount of current from the distribution line. The external DC power is supplied from a 9 volt AC adapter. The DC power jack is located on the input side of the VersaTap.

CAUTION:



A modified, commercially supplied AC adapter is the supplied power source. The cord has been spliced and reversed at the transformer end. The polarity of the plug has been changed; the barrel is negative and the tip is positive. If it is necessary to replace the adapter, Spectracom recommends replacing it only with an adapter conforming to the specifications listed.

ADAPTER SPECIFICATIONS

Output Voltage:	9-12 VDC
Minimum Output Current:	300 mA
Connector:	Coaxial "Barrel-Type" Plug
Polarity:	Barrel – Negative; Tip – Positive
Size:	5.5 mm O.D., 2.1 mm I.D.

6.2 Option 45 – RS-422 Output

Option 45 outputs the selected VersaTap frequency and lock status signals in EIA RS-422 signal levels. A TTL compatible signal of the selected frequency is also provided.

Option 45 replaces the Output B BNC connector with a 9 Pin Series D receptacle. Output A remains unchanged compared to the standard VersaTap. Refer to Figure 6-1.

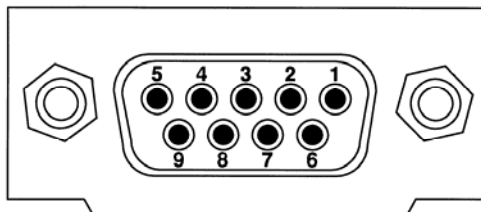


Figure 6-1: Option 45 Output B Connector

SPECIFICATIONSReference Input

- Signal:** 10 MHz sine wave
- Level:** 00 mV to 5.5 volts peak to peak
- Impedance:** High impedance. Must be terminated at the input connector with 50 ohms. Units equipped with a DC input option are supplied with a 50 ohm DC isolated load.
- Connector:** BNC

Output A

- Signal:** Sine wave at specified frequency
- Level:** 600 mV rms
- Impedance:** 50 ohms
- Connector:** BNC

Output B

<u>Pin Out:</u>	<u>Connector Pin</u>	<u>Signal</u>	<u>Mnemonic</u>
	Pin 1	Output Frequency	+Fout
	Pin 2	Output Frequency	-Fout
	Pin 5	Lock Status	+Lock
	Pin 4	Lock Status	-Lock
	Pin 9	TTL Output	TTL OUT
	Pin 3, 6, 7	Ground	GND

Description: Fout and Lock signals conform to the EIA RS-422 standard. Up to 32 receivers may be deployed at distances up to 4,000 feet. The +Fout signal is a positive going waveform, relative to –Fout, at the selected VersaTap output frequency. The +Lock signal is high relative to –Lock when the VersaTap is locked to the incoming reference. If the unit is not phase locked, the +Lock signal will be low relative to –Lock. Twisted pair cable should be used for each of the RS-422 signals. Terminate the lines with 120 ohms across each twisted pair at the last RS-422 receiver. The TTL output has a source impedance of 50 ohms.

- Connector:** 9 pin series D receptacle
- Indicators:** LED that lights when the VersaTap is phase locked to the incoming reference signal.

Power Requirements

Source: Normally powered by the 10 MHz distribution system. An Option 45 VersaTap consumes 250 mA from the distribution system. Option power sources are as follows:

<u>Option</u>	<u>Power</u>	<u>Mnemonic</u>
Pin 1	Output Frequency	+Fout
Pin 2	Output Frequency	-Fout
Pin 5	Lock Status	+Lock
Pin 4	Lock Status	-Lock
Pin 9	TTL Output	TTL OUT
Pin 3, 6, 7	Ground	GND

Size

Dimensions: 8.3 inches x 4.2 inches x 1.7 inches (211 mm x 107 mm x 43 mm).

Mounting

Hole Pattern: 8.87 inches x 2.75 inches (225 mm x 70 mm)

6.3 Option 46 – T1 Clock Extractor

This option allows the VersaTap to extract and de-jitter the T1 clock frequency from a DS1 data stream. The partially de-jittered 1.544 MHz clock is furnished at Output B. Output A is fully de-jittered by the phase locked loop of the VersaTap and converted to a frequency specified at the time of purchase. The signal input jack for this option accepts a “310” plug.

SPECIFICATIONSReference Input

Signal: DS1
Bit Rate: 1.544K bits per second ± 16 ppm (± 25 Hz)
Level: 1.0 to 3.6 volts base to peak
Impedance: 100 ohms
Connector: 310 jack

Output A

Signal: Sine wave at specified frequency
Level: 600 mV rms
Impedance: 50 ohms
Connector: BNC

Output B

Signal: 1.544 MHz extracted clock
Level: TTL
Impedance: 50 ohms

Connector: BNC
Indicators: LED that lights when the VersaTap is phase locked to the incoming reference signal

Power Requirements

Source: This option is provided with a 115V AC-DC adapter. The following power options are available:

<u>Option</u>	<u>Power</u>
52	12 VDC Input
53	24 VDC Input
54	48 VDC Input

A rectifier is provided in the power input circuit to protect the unit against reverse polarity.

Connector: Two position terminal block.

Size: 8.3 inches x 4.2 inches x 1.7 inches (211 mm x 107 mm x 43 mm).

Mounting

Hole Pattern: 8.87 inches x 2.75 inches (225 mm x 70 mm)

6.4 Option 48 – Framed All Ones Output

This option provides a T1 framed all ones signal and a 1.544 MHz sine wave output phase locked to the 10 MHz reference input. Units with Option 48 may be operated Spectracom Products having Option 03 (Built-in Distribution Amplifier), or any 10 MHz reference when using the supplied AC adapter. On heavily loaded distribution lines, the AC adapter may be used to prevent overloading the power supply of the distribution amplifier. Each Option 48 VersaTap consumes 200 mA.

SPECIFICATIONS

Reference Input

Signal: 10.0 MHz sine wave
Level: 100 millivolts to 5.5 volts peak to peak
Impedance: High impedance. Must be terminated at the input connector with 50 ohms. Terminator provided.
Connector: BNC

Output A

Signal: 1.544 MHz sine wave phase locked to the reference input
Level: 600 mV rms
Impedance: 50 ohms
Connector: BNC

Output B

- Signal:** DS1 framed all ones phase locked to the reference input
- Framing:** Selectable between D4 or extended super frame (ESF). Units are set at the factory to type D4 framing (193S). To change to ESF (193E), remove the cover and move the shorting plug located on the top mounted board to the 193E position.
- Level:** 2.4 to 3.6 volts base to peak into 100 ohms
- Connector:** Type 310
- Indicators:** LED that lights when the VersaTap is locked to the incoming reference signal

Power Requirements

- Source:** This unit is provided with an AC-DC adapter. The unit may be powered by this device or a Spectracom product equipped with Option 03, Built-in Distribution Amplifier. An Option 48 VersaTap consumes 200 mA.

- Size:** 8.3 inches x 4.2 inches x 1.7 inches (211 mm x 107 mm x 43 mm).

Mounting

- Hole Pattern:** 8.87 inches x 2.75 inches (225 mm x 70 mm)

6.5 Option 50 – VersaTap Composite Clock Output

This option provides a 64/8 Kb/s composite clock signal and a 64 kHz sine wave phase locked to the 10 MHz reference input to the VersaTap. A lock lamp indicates phase lock to the reference input. The unit is powered by the distribution system. Optional power sources are an AC-DC converter (Option 40), 12 VDC (Option 52), 24 VDC (Option 53), and 48 VDC (Option 54). Power required is 3.5 watts.

SPECIFICATIONS

Reference Input

- Signal:** 10 MHz sine wave
- Level:** 100 mV to 5.5 volts peak to peak
- Impedance:** High impedance. Must be terminated at the input connector with 50 ohms. Units equipped with a DC input option are supplied with a 50 ohm DC isolated load.
- Connector:** BNC

Output A

- Signal:** 64 kHz sine wave
- Level:** 500 mV rms
- Impedance:** 50 ohms
- Connector:** BNC

Output B

- Signal:** 64/8 Kb/s composite clock
- Level:** 2.4 to 3.6 volts base to peak into 133 ohm load
- Connector:** 310 jack
- Indicators:** LED that lights when the VersaTap is locked to the incoming reference signal

Power Requirements

- Source:** Normally powered by the 10 MHz distribution system. An Option 50 VersaTap consumes 200 mA from the distribution system. Option power sources are as follows:

<u>Option</u>	<u>Power</u>
40	AC-DC Converter
52	12 VDC Input
53	24 VDC Input
54	48 VDC Input

- Connector:** Terminal block
- Size:** 8.3 inches x 4.2 inches x 1.7 inches (211 mm x 107 mm x 43 mm)

Mounting

- Hole Pattern:** 8.87 inches x 2.75 inches (225 mm x 70 mm)

6.6 Option 50 with Option 46 – VersaTap DS1 Input Composite Clock Output

Option 50 with Option 46 is a combination that provides a 64/8 Kb/s composite clock signal and a 64 kHz sine wave that is phase locked to a DS1 reference. A lock lamp indicates phase lock to the reference input. The unit is powered by an AC-DC converter. Optional power sources are 12 VDC (Option 52), 24 VDC (Option 53), and 48 VDC (Option 54).

SPECIFICATIONSReference Input

- Signal:** DS1
- Bit Rate:** 1.544K bits per second ± 16 ppm (± 25 Hz)
- Level:** 1.0 to 3.6 volts base to peak
- Impedance:** 100 ohms
- Connector:** 310 jack

Output A

- Signal:** 64 kHz sine wave
- Level:** 500 mV rms
- Impedance:** 50 ohms

Connector: BNC

Output B

Signal: 64/8 Kb/s composite clock

Level: 2.4 to 3.6 volts base to peak into 133 ohm load

Connector: 310 jack

Indicators: LED that lights when the VersaTap is phase locked to the incoming reference signal

Power Requirements

Source: This option is provided with a 115V AC-DC adapter. The following power options are available:

<u>Option</u>	<u>Power</u>
52	12 VDC Input
53	24 VDC Input
54	48 VDC Input

A rectifier is provided in the power input circuit to protect the unit against reverse polarity.

Connector: Two position terminal block

Size: 8.3 inches x 4.2 inches x 1.7 inches (211 mm x 107 mm x 43 mm)

Mounting

Hole Pattern: 8.87 inches x 2.75 inches (225 mm x 70 mm)

6.7 Options 52, 53, and 54 – External DC Power Source

These options can be provided with any VersaTap to allow operation from an external DC power source. The input is isolated and either terminal may be grounded. The input is also diode-protected against reverse polarity. Power required is 3.5 watts.

SPECIFICATIONS

Source: Option 52: 10.4 to 19.4 VDC (12 VDC Input)
 Option 53: 19.4 to 37.4 VDC (24 VDC Input)
 Option 54: 37.4 to 73.4 VDC (48 VDC Input)

Connector: Terminal block

6.8 Option 58 – Framed CEPT Output

This option provides a framed CEPT signal and a 2.048 MHz sine wave output that is phase locked to a 10 MHz reference input. Units with Option 58 may be operated from a Spectracom Product with Option 03, Built-in Distribution Amplifier, or any 10 MHz reference when using the supplied AC-DC adapter. On heavily loaded distribution lines, the AC-DC adapter may be used to prevent overloading the power supply of the distribution amplifier.

SPECIFICATIONS

Reference Input

- Signal:** 10 MHz sine wave
- Level:** 100 mV to 5.5 volts peak to peak
- Impedance:** High impedance. Must be terminated at the input connector with 50 ohms. Units equipped with a DC input option are supplied with a 50 ohm DC isolated load.
- Connector:** BNC

Output A

- Signal:** 2.048 MHz sine wave phase locked to the input
- Level:** 600 mV rms
- Impedance:** 50 ohms
- Connector:** BNC

Output B

- Signal:** Framed CEPT output phase locked to the input
- Level:** 3.2 volts base to peak into 120 ohms
- Connector:** 310 jack
- Indicators:** LED that lights when the VersaTap is locked to the incoming reference signal

Power Requirements

- Source:** This unit is provided with an AC-DC adapter. The unit may be powered by this device or a Spectracom product equipped with Option 03, Built-in Distribution Amplifier. An Option 58 VersaTap consumes 200 mA.
- Size:** 8.3 inches x 4.2 inches x 1.7 inches (211 mm x 107 mm x 43 mm)

Mounting

- Hole Pattern:** 8.87 inches x 2.75 inches (225 mm x 70 mm)

6.9 Option 62 – Dual Framed All Ones Output Locked to 10 MHz Input

This option provides two DS1 framed all ones signals phase locked to a 10 MHz reference signal.

SPECIFICATIONS

Reference Input

- Signal:** 10.0 MHz sine wave
- Level:** 100 millivolts to 5.5 volts peak to peak
- Impedance:** High impedance. Must be terminated at the input connector with 50 ohms. The unit is supplied with a 50 ohm DC isolated load.
- Connector:** BNC

Outputs

- Signal:** Two DS1 framed all ones
- Level:** 3 volts base to peak
- Impedance:** 100 ohms
- Connector:** BNC

Jumpers: Internal jumpers are programmed at the factory to provide dual 193S outputs when phase locked to the 10 MHz input and unframed all ones when not phase locked. Removing the shorting plug at HDR5 removes the outputs when not phase locked. Moving the shorting plug at HDR3 to the upper position programs the unit to the 193E format when phase locked to the reference signal.

Indicators: LED that lights when the VersaTap is locked to the incoming reference signal. A TTL output is also provided on the terminal block for remote lock indication.

Power Requirements

Source: This option is provided with a 115V AC-DC adapter. The following power options are available:

<u>Option</u>	<u>Power</u>
52	12 VDC Input
53	24 VDC Input
54	48 VDC Input

A rectifier is provided in the power input circuit to protect the unit against reverse polarity.

- Connector:** Two position terminal block
- Size:** 8.3 inches x 4.2 inches x 1.7 inches (211 mm x 107 mm x 43 mm)

Mounting

Hole Pattern: 8.87 inches x 2.75 inches (225 mm x 70 mm)

6.10 Option 63 – Framed All Ones Output Locked to 4ESS Input

This option provides a T1 framed all ones signal and a 1.544 MHz sine wave output phase locked to the 4ESS (16.384 MHz) reference input. Units with Option 63 are powered from an AC to DC adapter.

SPECIFICATIONS

Reference Input

Signal: 4ESS, 16.384 MHz with missing pulse every 2048 pulses
Level: 300 mV to 2 volts peak to peak
Impedance: 75 ohms
Connector: BNC

Output A

Signal: 1.544 MHz sine wave phase locked to the input
Level: 600 mV rms
Impedance: 50 ohms
Connector: BNC

Output B

Signal: DS1 framed all ones signal phase locked to the input
Level: 2.4 to 3.6 volts base to peak into 100 ohms
Connector: 310 jack
Indicators: LED that lights when the VersaTap is locked to the incoming reference signal

Power Requirements

Source: This unit is provided with a 115V AC-DC adapter and consumes 2 watts at 9 VDC

Size: 8.3 inches x 4.2 inches x 1.7 inches (211 mm x 107 mm x 43 mm)

Mounting

Hole Pattern: 8.87 inches x 2.75 inches (225 mm x 70 mm)

6.11 Option 64 – DS-1/DS1-C Input

Option 64 provides an 8 kHz or 800 kHz TTL output phase-locked to a DS1 or DS1C input. The input is selected by a toggle switch located net to the input jack. The output is selected using internal jumpers.

SPECIFICATIONS

Reference Input

Signal: DS1 or DS1C signal
Level: 1.0 to 3.6 volts base to peak
Impedance: 100 ohms
Connector: 310 jack

Output A

Signal: 8 kHz or 800 kHz square wave, selected using internal jumpers
Level: TTL
Impedance: 75 ohms
Connector: BNC

Output B

Signal: 1.544 MHz or 3.152 clock signal or phase locked signal (high when locked)
Level: TTL
Impedance: 75 ohms
Connector: BNC

Jumpers: To change the Output A frequency from 8 kHz to 800 kHz, disconnect the VersaTap power, remove the top cover, and unfasten the top board. Remove jumpers from J6-3, 5, 11, 13, 15, 17, 19. Add jumpers to J6-7. Fasten the top board, install the cover, and reconnect the power source. (To change the Output A frequency from 800 kHz to 8 kHz, reverse this procedure.)

To change Output B from clock to phase lock indication, disconnect the VersaTap power, remove the top cover, remove the jumper from W5, and install the jumper on W6.

Indicators: LED that lights when the VersaTap is locked to the incoming reference signal

Power Requirements

Source: This option is provided with a 115V AC-DC adapter and consumes 2 watts at 9 VDC.

Size: 8.3 inches x 4.2 inches x 1.7 inches (211 mm x 107 mm x 43 mm)

Mounting

Hole Pattern: 8.87 inches x 2.75 inches (225 mm x 70 mm)

6.12 Option 65 – CEPT INPUT

This option extracts and outputs a partially de-jittered 2.048 MHz clock from a CEPT input. An output phase locked to the CEPT clock is also provided. The phase locked output frequency is specified at the time of purchase. A lock lamp indicates phase lock to the CEPT input. The unit is powered by an AC-DC converter. Optional power sources are 12 VDC (Option 52), 24 VDC (Option 53), and 48 VDC (Option 54).

SPECIFICATIONS

Reference Input

Signal: CEPT Symmetrical Pair
Bit Rate: 2.048K bits per second ± 12 ppm (± 25 Hz)
Level: 1.0 to 3.6 volts base to peak
Impedance: 120 ohms
Connector: 310 jack

Output A

Signal: Sine wave at specified frequency
Level: 600 mV rms
Impedance: 50 ohms
Connector: BNC

Output B

Signal: 2.048 MHz
Level: TTL
Impedance: 50 ohms
Connector: BNC

Indicators: LED that lights when the VersaTap is phase locked to the incoming reference signal

Power Requirements

Source: This option is provided with a 115V AC-DC adapter. The following power options are available:

<u>Option</u>	<u>Power</u>
52	12 VDC Input
53	24 VDC Input
54	48 VDC Input

Connector: Two position terminal block.

Size: 8.3 inches x 4.2 inches x 1.7 inches (211 mm x 107 mm x 43 mm).

Mounting

Hole Pattern: 8.87 inches x 2.75 inches (225 mm x 70 mm)

6.13 Option 66 – Dual E1 Framed All Ones Output

The Spectracom Model 8140VT VersaTap equipped with Option 66 provides two E1 Framed All Ones outputs. This VersaTap can be powered from a Spectracom product equipped with Option 03, Built-in Distribution Amplifier, or from an external power source. External power options include Option 40 AC power adapter, Option 53 ± 24 VDC or Option 54 ± 48 VDC.

Option 66 units are equipped with a terminal block connector to provide the two E1 Framed All Ones outputs. The terminal block connector also includes a phase lock status indicator. This output shall be a TTL level high (1) whenever the VersaTap is phase locked to the applied CC reference and a TTL low (0) when not locked. Refer to Figure 6-2 for the output connector pin out.

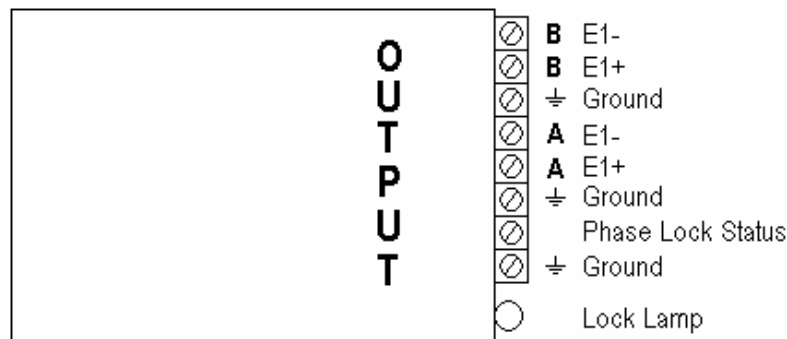


Figure 6-2: Framed All Ones Connector

The E1 outputs are available with CRC4 Multiframe or CAS Multiframe. Option 66 equipped units are factory configured for CRC4 Multiframe. CAS Multiframe is enabled by moving internal shorting plugs on HDR1 of the Framed All Ones generator board as shown in Figure 6-3. Refer to Figure 6-4 for assistance in locating HDR1.

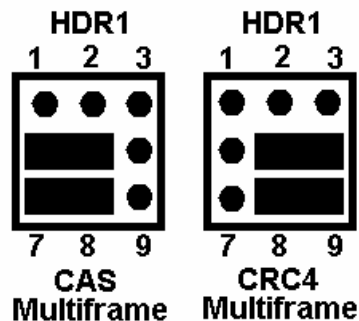


Figure 6-3: Frame Selection Jumpers

The outputs may also be programmed to provide either an Unframed All Ones or complete removal of the signal whenever the VersaTap is not phase locked to the 10 MHz input reference. The unit is factory configured to provide an Unframed All Ones when unlocked. To program the E1 outputs for complete removal when unlocked, remove the shorting plug found on HDR5.

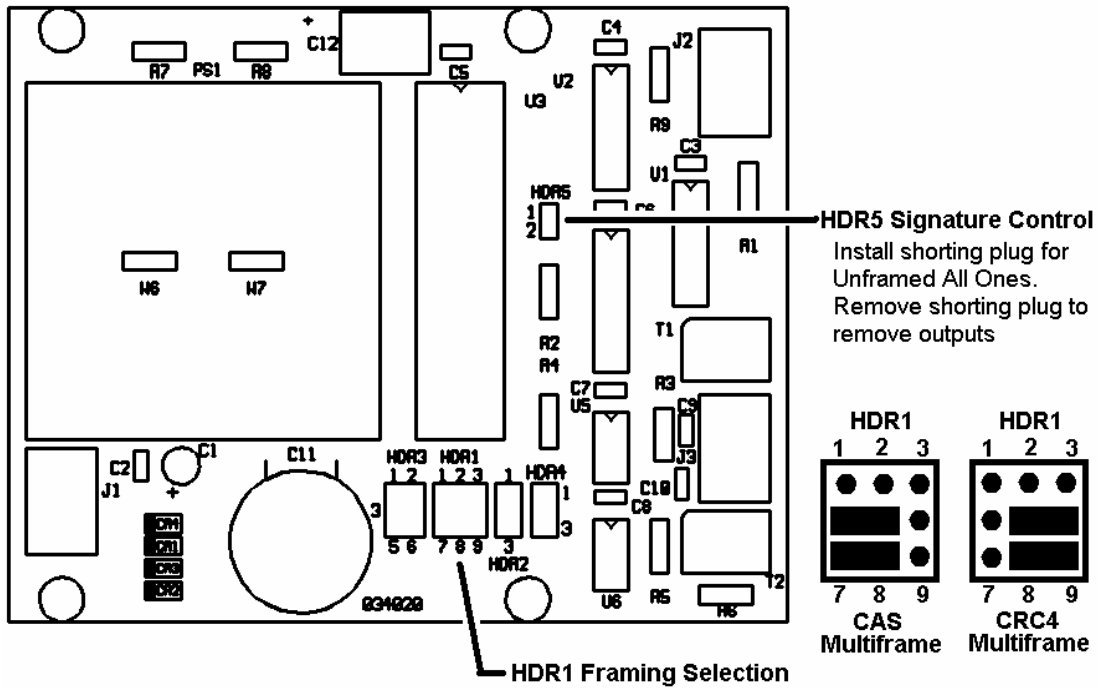


Figure 6-4: Programmable Jumper Locations

SPECIFICATIONS

- Signal: Two E1 Framed All Ones
- Framing: CAS or CRC4 Multiframe; internal jumper selection. Factory configured for CRC4.
- Level: 3.0 Vpk into 100-ohms
- Connector: Terminal strip

Spectracom Corporation

95 Methodist Hill Drive

Rochester, NY 14623

www.spectracomcorp.com

Phone: US +1.585.321.5800

Fax: US +1.585.321.5219