# INSTRUCTION MANUAL

# SERVICE CHANNEL CONVERTER - SERIES 1795

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When ordering parts from Cross Technologies, Inc., be sure to include the equipment model number, equipment serial number, and a description of the part.

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**CROSS TECHNOLOGIES, INC.**
**6170 SHILOH ROAD**
**ALPHARETTA, GEORGIA 30005**

**(770) 886-8005**
**FAX (770) 886-7964**

**WEB www.crosstechnologies.com**
**E-MAIL info@crosstechnologies.com**

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## SERIES 1795 SERVICE CHANNEL CONVERTER

## SECTION 1. - GENERAL INFORMATION

### 1.1 GENERAL

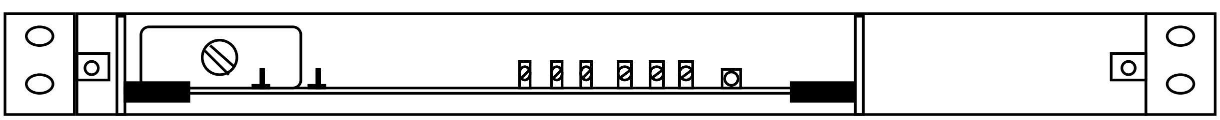
This instruction manual contains the information necessary to install and operate the Service Channel Converter. Figure 1.1 shows the Service Channel Converter.

### 1.2 EQUIPMENT DESCRIPTION

The Service Channel Converter (Figure 1.1) is a complete single sideband modulator/demodulator. The baseband inputs are divided into three channels. Channels 1 and 2 are to be used for baseband frequencies between 300Hz and 12kHz. Channel 3 is designed for baseband frequencies between 16kHz and 108kHz typically used for 24 channel multiplex. The transmit output has four separate outputs for driving separate sources. Conversely, the receive input has four separate inputs for multiple source applications.

### 1.2.1 PACKAGING INFORMATION

The Service Channel Converter is designed for mounting in a standard EIA equipment rack. The enclosure is 19" wide by 13" deep by 1-3/4" high (one rack unit).



## FIGURE 1.1 SERIES 1795 SERVICE CHANNEL TRANSLATOR

**TABLE 1.1 SERIES 1795 MODEL NUMBER AND FREQUENCY CHART**

| MODEL - # | | FREQUENCY INFORMATION | | | | | |
|---|---|---|---|---|---|---|---|
| - AC | - DC | Fosc | Flat (±0.5dB)BW( 0.125Mhz) | | Fc =Fo+0.06 | 3db BW Fc±0.100Mhz | |
| 05 | 06 | 5.650 | 5.650 | **5.775** | 5.7125 | **5.6125** | **5.8125** |
| 09 | 10 | 7.045 | 7.045 | **7.170** | 7.1075 | **7.0075** | **7.2075** |
| 03 | 01 | 8.590 | 8.590 | **8.715** | 8.6525 | **8.5525** | **8.7525** |
| 07 | 08 | 8.850 | 8.850 | **8.975** | 8.9125 | **8.8125** | **9.0125** |
| 04 | 02 | 9.023 | 9.023 | **9.148** | 9.0855 | **8.9855** | **9.1855** |
| 11 | 12 | 9.250 | 9.250 | **9.375** | 9.3125 | **9.2125** | **9.4125** |
| 14 | 13 | 8.300 | 8.300 | **8.425** | 8.3625 | **8.2625** | **8.4625** |
| 15 | 16 | 5.400 | 5.400 | **5.525** | 5.4625 | **5.3625** | **5.5625** |

## TABLE 1.2 - SERVICE CHANNEL CONVERTER SPECIFICATIONS

| CHARACTERISTIC | SPECIFICATION |
|---|---|
| **TRANSMIT/RECEIVE LOOPED** | |
| **Frequency Response** | |
| CH 1/CH 2 | ± 2db |
| CH 3 | ± 0.5db/4kHz, ± 2db Total |
| **Signal to Noise** | |
| CH 1/CH 2 | 60db |
| **Harmonic Distortion** | |
| CH 1/CH2 | < 1% |
| **Frequency Stability** | |
| Temperature (+10° to 40° C) | ±1 X 10^-7 |
| Aging Rate (First Year) | ±5 X 10^-9 / Day Average, ±1 X 10^-6 / Year |
| Short Term Stability | 1 X 10^-9 /Second (Constant Temperature) |
| Frequency Adjust. Setability | ± 1 X 10-7 |
| **TRANSIT INPUTS / RECEIVE OUTPUTS SPECIFICATIONS** | |
| **Frequency** | |
| CH 1, CH 2 | 0.3 - 12kHz |
| CH 3 | 16kHz -108kHz |
| **Impedance** | |
| CH 1 and CH 2 | 600 ohms Balanced |
| CH 3 | 75 ohms Unbalanced |
| **Levels** | |
| CH 1 /CH 2 | -20dbm Average -14dbm MAX |
| CH 3 | -20dbm MAX |
| **Connectors** | |
| CH I / CH 2 | Barrier Strip |
| CH 3 | BNC Female |
| **TRANSIT END-OUTPUT / RECEIVE INPUT SPECIFICATIONS** | |
| Type | Single Sideband Suppressed Carrier |
| Frequency | 5.65, 7.045, 8.30, 8.59, 8.85,9.023, 9.25 MHz |
| Bandwidth | 110 kHz Nominal |
| Number of Out, Inputs | Four |
| Impedance | 75 ohms Unbalanced |
| Level | -16 dbm MAX TX Output<br>-10 dbm MAX Total Power RX Input |
| Lower Sideband Rej. | 30db MIN Tx and Rx |
| Carrier Level | -70dbm MAX |
| Port to Port isolation | 40 db MIN |
| Connectors | BNC Female |
| **POWER REQUIREMENTS** | |
| **AC** Voltage | 105-130 or 210-260 VAC |
| Frequency | 47-63Hz |
| Power | 15 Watts |
| **DC** Voltage | -21 to -32 or -42 to -56 VDC |
| Current | 375ma Typical 400ma MAX |
| **MECHANICAL** | |
| Size | 1-3/4" x 19"W x 13"D |
| Weight | 8-3/4 lbs (4Kg) |

## 1.3 SERVICE

**1.3.1 DAMAGE IN SHIPMENT** - AFTER unpacking the Service Channel Converter, should any damage be discovered, IMMEDIATELY file a claim with the carrier. Contact Cross Technologies, Inc. for immediate assistance.

**1.3.2 TECHNICAL ASSISTANCE** - If technical assistance is required in support of the mainframe assembly, contact Cross Technologies, Inc. at (770) 886-8005 or direct service inquires to:

CROSS TECHNOLOGIES, INC.
6170 Shiloh Road
Alpharetta, Georgia 30005
ATTENTION: Service Department

**1.3.3 WARRANTY** -The following warranty applies to all Cross Technologies, Inc. products.

All Cross Technologies, Inc. products are warranted against defective materials and workmanship for a period of one year after shipment to customer. Cross Technologies, Inc.'s obligation under this warranty is limited to repairing or, at Cross Technologies, Inc.'s option, replacing parts, subassemblies, or entire assemblies. Cross Technologies, Inc. shall not be liable for any special, indirect, or consequential damages. This warranty does not cover parts or equipment which have been subject to misuse, negligence, or accident by the customer during use. All shipping costs for warranty repairs will be prepaid by the customer. There are no other warranties, express or implied, except as stated herein.

## SECTION 2 - INSTALLATION/OPERATION

**2.1 INSTALLATION** - After receiving and inspecting the Service Channel Converter, install the unit by bolting the front panel mounting ears to the rack. Connect the Service Channel Converter as outlined in the following sections according to your application.

**2.2 FRONT PANEL ASSEMBLY (see Figure 2.1)** - The mainframe front panel is packaged separately from the equipment. After the mainframe is installed and interconnected for its service, the front panel is prepared for installation. A separate package of panel fasteners is provided. Carefully follow the installation procedure in sequence.

**CAUTION! Once the two fastener components are mated, there is no easy way to separate them.** If an error is made in assembly, the fastener can be cut away using side-cutters, but new components must be used to complete the assembly.

A. Remove the front panel from its bubble pack bag.

B. Normally, the front panel will have an adhesive paper protecting the blank side. Peel off this adhesive paper and discard.

C. Take the package of panel fasteners and separate the grommets (Wegener Communications part no. 21300) from the plungers (part no. 21301).

D. Observe step 1 in figure 2.1 and press a grommet into a front panel hole. Insertion must be from the silkscreened side through to the blank side. Fill all front panel holes with grommets.

E. Observe step 2 in figure 2.1 and press a plunger into each grommet. Each fastener is now inseparable.

F. Pull each plunger out to its limit. Align the projecting grommets from the blank back side with the mainframe tabs and gently push the panel in. The grommets should fit the mainframe tabs snug and require a minimum of pressure.

G. Press each plunger into the grommet. This action spreads the grommet body to securely hold the front panel.

H. To remove an installed front panel, pull each plunger out to its limit. The front panel can now be lifted away from the mainframe.

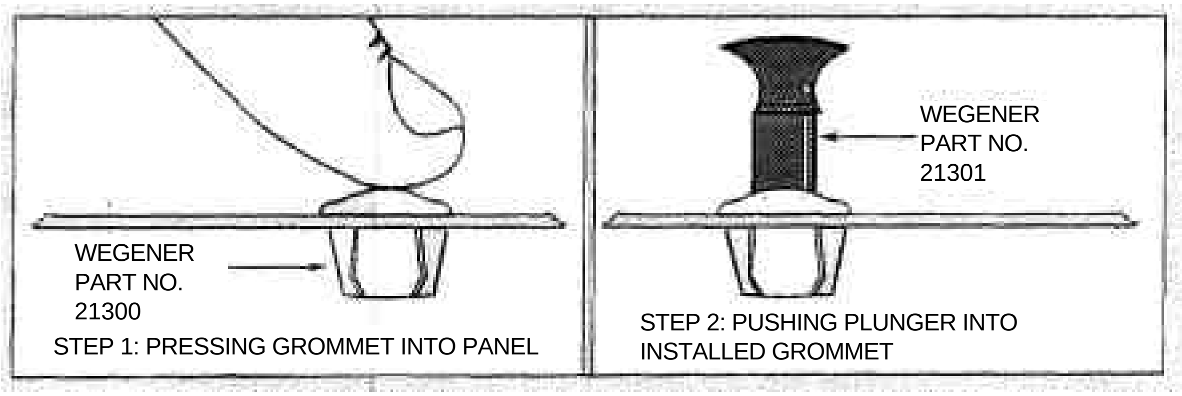



**FIGURE 2.1 INSTALLING FRONT PANEL**

## 2.3 INPUT/OUTPUT CONNECTIONS (FIGURE 2.2)

**Table 2.2 INPUT/OUTPUT CONNECTIONS(FIGURE 2.2)**

| Connector | Function | Signal Description |
|---|---|---|
| J1 and J2 | These connectors are for the plug-In module and are referenced for trouble-shooting ease only. | Provides interconnects For PCB |
| J3 | CH3 TX input | The 75 ohm, 16 - 110 KHZ transmit input to Channel 3 |
| J4 | CH3 RX output | The 75 ohm, 16 - 110 KHZ receive output of Channel 3 |
| J5 - J8 | TX RF output | The 75 ohm RF (5 - 9 MHz) outputs (four) of the Service Channel Converter. These outputs are completely identical. |
| J9 - J12 | RX RF input | The 75 ohm RF (5 - 9 MHz) inputs (four) of the Service Channel Converter. These outputs are completely identical. |

## Table 2.2 INPUT/OUTPUT CONNECTIONS (CONTINUED)

| Connector | Function | Signal Description |
|---|---|---|
| **TB1** | **Channels 1 and 2 I/O** | |
| -1 | CH 2' out | One-half of CH2 600 Ω balanced output |
| -2 | CH 2 out | One-half of CH2 600 Ω balanced output |
| -3 | Ground | Chassis Ground |
| -4 | CH1' out | One-half of CH1 600 Ω balanced output |
| -5 | CH1 out | One-half of CH1 600 Ω balanced output |
| -6 | Ground | Chassis Ground |
| -7 | CH2' in | One-half of CH2 600 Ω balanced input |
| -8 | CH2 In | One-half of CH2 600 Ω balanced input |
| -9 | Ground | Chassis Ground |
| -10 | CH1. In | One-half of CH1 600 Ω balanced input |
| -11 | CH1 in | One-half of CH1 600 Ω balanced input |
| -12 | Ground | Chassis Ground |
| **TB2** | **DC Power Input (DC Units Only)** | |
| -1 | -48 VDC in | The input power terminal used for -48 VDC operation. |
| -2 | -48 VDC RTN | The return terminal for the -48 VDC primary power input. It is connected to chassis ground. |
| -3 | -24 VDC RTN | The return terminal for the -24 VDC primary input. It is connected to chassis ground. |
| -4 | -24 VDC in | The input power terminal used for -24 VDC operation. |

## 2.4 CONTROLS AND INDICATORS (see FIGURE 2.2)

### TABLE 2.4 CONTROLS AND INDICATORS (FIGURE 2.2)

| Item | Function | Description |
|---|---|---|
| CR8 | PWR ON | LED on Right Front of plug-in PWB which indicates primary power is applied. |
| Rll | CH1 TX input level | This potentiometer (2nd from right) is used to adjust the input to the modulator via CH1.The level is set to a peak program level of -14 dbm Into 600 ohms. |
| R25 | CH2 TX input level | This potentiometer (far right) is used to adjust the input to the modulator via CH2. The level is set to a peak program level of -14 dbm into 600 ohms. |
| R55 | CH3 TX input level | This potentiometer (third from right) is used to adjust the input to the modulator via CH3. The level is set to a peak program level of -20 dbm into 75 ohms. |
| R183 | CH1 RX output level | This potentiometer (second from left) is used to adjust the receive output level of CH1. The level is normally set to -14 dbm peak program level into 600 ohms. |
| R190 | CH2 RX output level | This potentiometer (third from left) is used to adjust the receiver output level of CH2. The level is normally set to-14 dbm peak program level into 600 ohms. |
| R152 | CH3 RX output level | This potentiometer (far left) is used to adjust the receive output level of CH3. The level is normally set to -20 dbm into 75 ohms. |
| R250 | Carrier null | This potentiometer in conjunction with R276 is used to null the carrier out of the TX outputs.These pots are accessible through the two holes in top cover |
| R276 | Carrier null | This potentiometer in conjunction with R250 is used to null the carrier out of the TX outputs.These pots are accessible through the two holes in top cover |



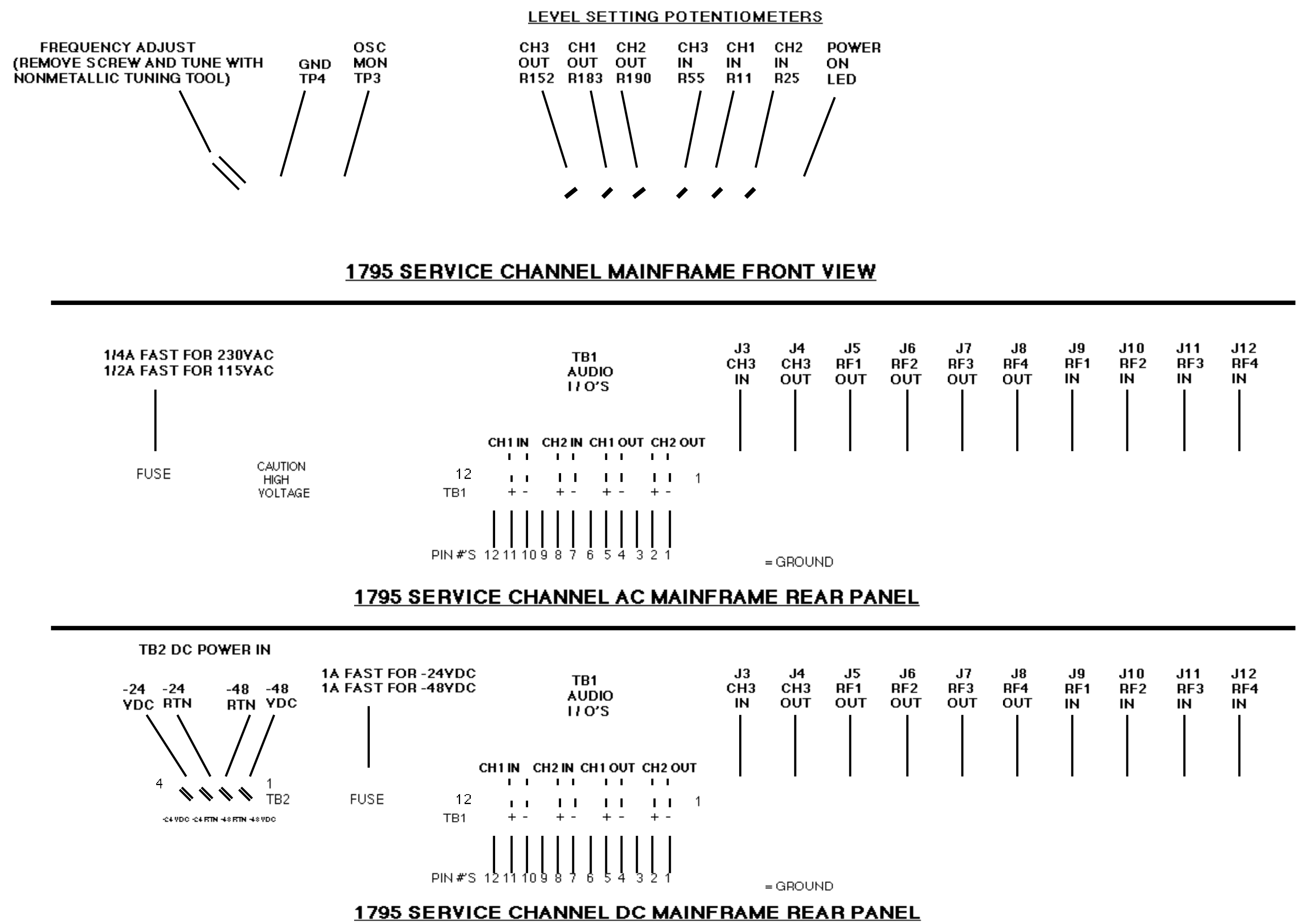



**FIGURE 2.2 1795 FRONT AND REAR PANELS**

## 2.5 OPERATION

**2.5.1 initial Turn-On -** Measure the primary power voltage to insure they are within specified tolerance before connecting power to Service Channel Converter. Connect power to Service Channel Converter via the Line Cord for AC units, or via TB2 for DC units making sure the polarization is correct on DC units. The Service Channel Converter is diode protected in the event power is connected backwards. Verify power indicating LED (CR8) is illuminated on front panel after power is applied.

## 2.6 OPERATIONAL CHANGES

**2.6.1 INTERFACE LEVEL CHANGES (TX INPUT) -** The TX input levels are set at the factory for the interface levels specified in Table 2.4. The Service Channel Converter has been optimized for these levels. (Channels 1 and 2, -14dbm @ 600 ohms; Channel 3 -20dbm @ 75 ohms Peak Program Level providing a -16 dBm RF output) and should be operated accordingly. If it is impossible to change the levels of the input signals, the interface levels can be altered by performing the following procedure.

a) Define the maximum level that will be applied to the Service Channel Converter channel input in question.

b) Apply a 10kHz Sine-Wave at the maximum level (as determined in previous step) to the Service Channel input to be adjusted. Remove other baseband channel inputs.

c) Monitor one of the TX output ports (J5-J8) on backplane with a spectrum analyzer. Monitor the upper sideband level which will appear 10 kHz above carrier frequency (Fo of A1 as counted at TP3).

d) Adjust the appropriate potentiometer for the channel to be adjusted (as shown in Table 2.3) for a -16dbm upper sideband level.

e) Remove test equipment connections and reconnect the Service Channel Converter inputs.

**2.6.2 INTERFACE LEVEL CHANGES (RX OUTPUT)** - The receive interface levels are factory adjusted for unity gain in and out of a looped Service Channel Converter. These levels (-14dbm @ 600 ohms for Channel 1 and 2, and -20dbm @ 75 ohms for Channel 3) can be raised or lowered depending on your application by adjusting the appropriate potentiometer as outlined in Table 2.4. There is 3 to 6db more gain available and at least 6 dB of attenuation available.

**<u>CAUTION!</u>** If you need to make the following Power changes in the field, be very cautious to make the changes accurately! **Improper connection of power will destroy the circuitry** and damage resulting from incorrectly making these changes **is not covered by the warranty!** These changes are best made at the factory and please contact Cross Technologies, Inc. for this.

**2.6.3. DC Primary Power Changes** - The DC Primary Power applied to the Service Channel Converter can be changed by rewiring the backplane as follows:

a) Remove Primary Power from Service Channel Converter.
b) Remove the top cover from the Service Channel Converter.
c) For -24 VDC operation move F1 wires to E2 and E4. For -48 VDC operation move F1 wires to E1 and E3.
d) inspect all connection carefully and clean solder connections.
e) Put the top cover on the Service Channel Converter.
f) Connect Primary Power to TB2 as outlined in Section 2.5.1.

**2.6.4 AC Primary Power Changes**

a) Remove Primary Power from Service Channel Converter.
b) Remove AC cover from backplane.
c) For 115 VAC operation, jumpers should be from **E4 to E6**, and **E5 to E7** **<u>only</u>**.
d) For 230 VAC operation, a jumper should be from **E4 to E5** **<u>only</u>**. Also, a different power cord is used for 230 VAC and for 115 VAC.
e) **Inspect and clean all connections carefully!**
f) Install AC shield on backplane.

**<u>NOTE:</u>** The AC Shield has a caution high voltage label. Make sure 230 VAC operation is indicated on the sticker if the unit is wired for 230 VAC.

g) Apply primary power as outlined in Section 2.5.1.

## SECTION THREE - TECHNICAL DESCRIPTION

**3.1 GENERAL BLOCK DIAGRAM** - Figure 3.1 is a general block diagram of the Service Channel Converter.

Referring to Figure 3.1, the signal path begins with the transmit inputs of channels 1, 2 and 3 in the top left hand corner. Channels 1 and 2 are amplified, summed together and filtered by a 12kHz active low pass filter (U3 and U5). Channel 3 is amplified and summed together with channels 1 and 2. The combination of all 3 channels are fed to a 300Hz high pass filter (U6) and a 110kHz low pass filter (L1, L2, C41, C42 and C45) The output of the 110kHz filter is amplified (U7B) and routed to the 2 baseband phase shift networks (U21, U22, U24 and U25). The output of the phase shifters are fed to double sideband suppressed carrier modulators (U23 and U26). The outputs of the modulators are summed via R292 (R292 is used for the lower sideband rejection adjustment) and bandpass filtered (L9, L10, L11 and L12). The output of the bandpass filter is then amplified (Q20 and Q21) and buffered (Q22, Q23, Q24 and Q25) for the four separate transmit outputs.

The carrier frequency is generated by an on-board TCXO A1 (temperature compensated crystal oscillator). The oscillator output is fed to 2 - 45° phase shifters whose outputs are 90° out of phase. The phase difference between the carrier frequencies and baseband frequencies (both RX and TX) cause at least 30db of rejection of the undesired lower sideband for the modulation and the demodulation guaranteeing at least 60db of rejection looped.

The receive inputs are buffered (Q6, Q7, Q8 and Q9), summed (Q10), and bandpass filtered (L5, L6, L7 and L8). The output of the bandpass filter is amplified (Q13 and Q14) and fed to 2 mixers which act as demodulators (U8 and U9). The outputs of the demodulators are fed to 2 phase shift networks (U11, U12, U13 and U14) whose outputs are combined (R132) and buffered (U15A). The baseband output is then fed to a 110kHz low pass filter (L3, L4, C86, C87 and C88). The output of the 110kHz lowpass filter is buffered (U16A) and amplified (U16B) for the channel 3 output. The buffered output (U16A) is fed to the 12kHz low pass filter (U17 and U18). The output of the 12kHz filter is resistively split and fed to the balanced amplifier for CH 1 (U19) and CH 2 (U20) receive outputs.

The power supplies on board for the Service Channel will work for either AC or DC mainframes and either input voltage range (115 or 230 VAC or -24 or -48 VDC). The AC transformer is the only part of the power supply mounted on the backplane board. The AC version input power is fed to the rectifier bridge (CR3-CR6), filtered (C117 and C118) and routed to the voltage regulators (VR1 and VR2). The DC version input power is routed to the pre-regulator (Q5) whose output is fed to VRI and VR2. CR1 and CR7 are used for protection purposes. VR1 and VR2 supply all the necessary power for the Service Channel Converter (-8 VDC and -15 VDC).

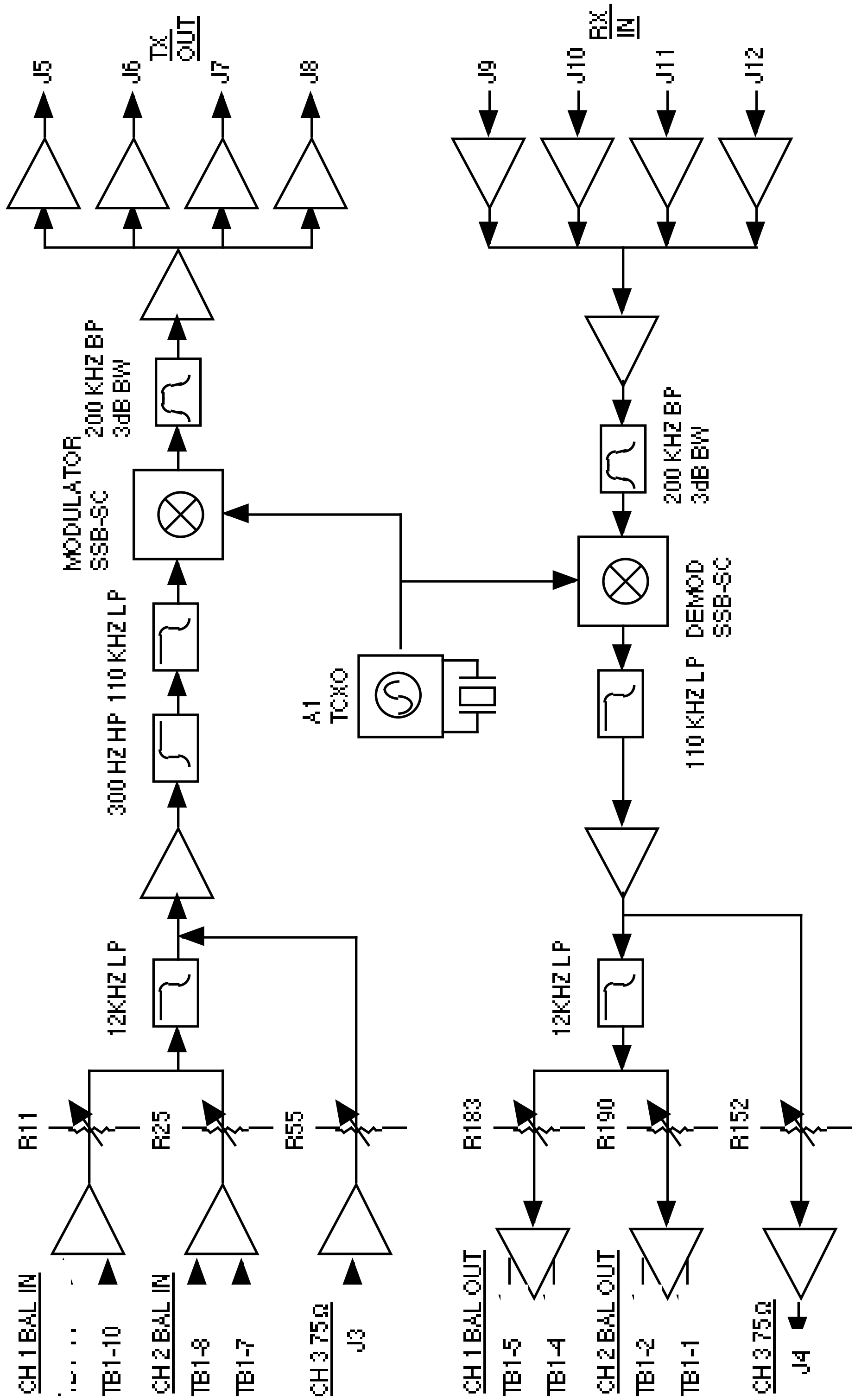



**Figure 3.1 Service Channel Block Diagram**

# SECTION 4 - MAINTENANCE

## 4.1 PERIODIC ADJUSTMENTS

The following items should be periodically checked and readjusted as required.

### 4.1.1 Carrier Null

The Carrier Level Out of the transmit output is specified to be less than or equal to -70 dbm. Measure the carrier output or one of the TX ports (J5 - J8) with a spectrum analyzer. If the carrier level exceeds the specified value then perform the following procedure.

While monitoring the output of the transmit side, remove the mounting screws and slide the service channel converter out of the rack far enough to have the top adjustment holes accessible. Using a small screwdriver-type adjustment tool, alternate between the carrier adjustments (R250, and R276) until the carrier is below-70 dbm.

Return the Service Channel Converter to its original position and replace mounting screws.

### 4.1.2 Carrier Freq

Monitor Test Point 3 (see Figure 2.2) on front lefthand edge of the main PWB with a high stability counter. Verify the output frequency is within 1 Hertz of the desired carrier frequency (frequency is stamped on top of oscillator). If the frequency is out of adjustment, remove the adjustment cover on the front of the oscillator. Using a non-magnetic screwdriver-type adjustment tool, adjust the frequency to within 0.5 Hz of the desired frequency and reinstall adjustment cover to oscillator.

# 1795 TEST PROCESS SHEET

11/20/97

**MODEL: 1795 -_____ SERVICE CHANNEL CONVERTER** **S/N:________**

**Name:__________________________** **Date:________**

| - AC | - DC | Fosc | Flat (±0.5dB)BW( 0.125Mhz) | | Fc =Fo+0.06 | 3db BW Fc±0.100Mhz | |
|---|---|---|---|---|---|---|---|
| 05 | 06 | 5.650 | 5.650 | **5.775** | 5.7125 | **5.6125** | **5.8125** |
| 09 | 10 | 7.045 | 7.045 | **7.170** | 7.1075 | **7.0075** | **7.2075** |
| 03 | 01 | 8.590 | 8.590 | **8.715** | 8.6525 | **8.5525** | **8.7525** |
| 07 | 08 | 8.850 | 8.850 | **8.975** | 8.9125 | **8.8125** | **9.0125** |
| 04 | 02 | 9.023 | 9.023 | **9.148** | 9.0855 | **8.9855** | **9.1855** |
| 11 | 12 | 9.250 | 9.250 | **9.375** | 9.3125 | **9.2125** | **9.4125** |
| 14 | 13 | 8.300 | 8.300 | **8.425** | 8.3625 | **8.2625** | **8.4625** |
| | | | **BOLD = MARKER FREQUENCIES** | | | | |

**INITIAL** - Insure **AC shield** installed with warning label. All pots **mid-range** or to **pre-sets.** Do Steps **1-4, 5-7, 8-9 & 10-12** together when doing multiple units at once**.**

**1.)POWER SUPPLY**

| | |
|---|---|
| -24 to **TB2-4** | Current 350 typ <375 |
| -48 to **TB2-1** | Current 350 typ <375 |
| -42 | **TP5** -17.5V min. |
| -56 | **TP5** -17.5 to -21; Collector of Q5 @ -38V max. |
| 115 | **TP5** -20 to -25, 1.5V p-p max ripple; |
| ALL UNITS | **TP6** -15± .5; **TP7** -8± .2 |

(If no output, adjust R306)

**2.)TX OUT FILTER - J1 center pin to non-dot**;HP8505A generator (75Ω) at -30 dBm to**TP10;** output **J5** in 75Ω; Sweep Fc±180Khz. Markers - F(3dB), Fo +.125Mhz. **R306** at mid-range to start, for **12db** gain when filter is tuned correctly (max gain ≈26 - 30db).
Adjust **L9 L10 L11 L23 C193 C199** for ±0.5& 3dB BW. Start **C193 min & C199 mid**.
Check **J6, J7, J8** for signal continuity.
Put **J1** in the **center pin to dot** position.

**3.)RX IN BP FILTER** - Input -30dBm to **J9** ; output **TP8**
**R226** at mid-range to start, for **+3db** gain when filter is tuned right (max gain ≈14 - 16db).
Adjust **L5 L6 L7 L8 C148 C161** for ±0.5& 3dB BW. Start **C148 min & C161 mid**.
Check **J10, J11, J12** for continuity.

(CCW increases Osc freq)

**4.)OSC. FREQUENCY AND LEVEL -** Monitor **TP3 -**
Set L0 frequency (oscillator can) to ±**1.0 Hz** using 1 X 10^-9 accuracy counter; 1 Hz low is best.
Set **R351** for **250 ±50 mv** level using a **10X** scope probe.

(Peak TX & RX filters 0.5 dB at 12 KHz)

**5.)TX 12K FILTER** - With the Wavetek, input 1Khz, -14dbm (.43Vp-p) (Monitor U1P1) to **TX Ch 1**, **TB1-10**;**R71** to mid-range;**R11** for 800mvp-p (-9.0dBm) at **TP2;**
Sweep 1 - 12 KHz;Adjust **R37 R41 R46 R49** for ±0.5db, +0.5 dB (1/2 division at 50mv/div).
Tie **TB1-11** to **TB1-10**;note less than 15 mv p-p at **TP2**

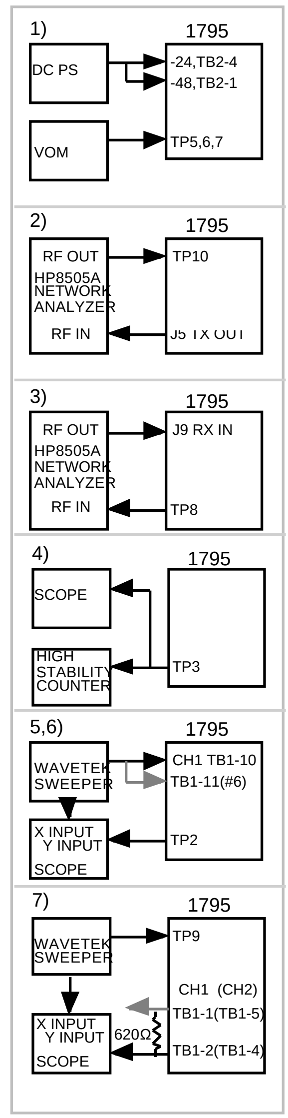
(Peak TX & RX filters 0.5 dB at 12 KHz)

**6.)TX CH2** - With the Wavetek, input 1Khz, -14dbm (.43Vp-p) to **TX Ch 2, TB1 -7** (Mon U4P1);Set **R25** for 800mvp-p (-9.0dBm) at **TP2**
Sweep 1 - 12 KHz;Tie **TB1 -8** to **TB1 -7;**note less than 15 mv p-p at **TP2**

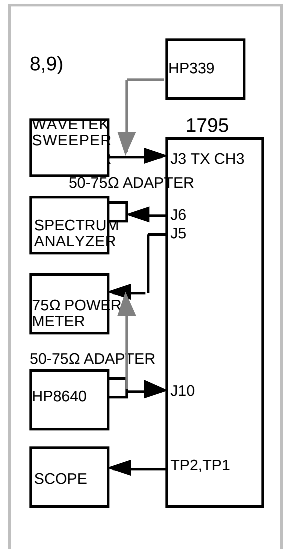
(Peak TX & RX filters 0.5 dB at 12 KHz)

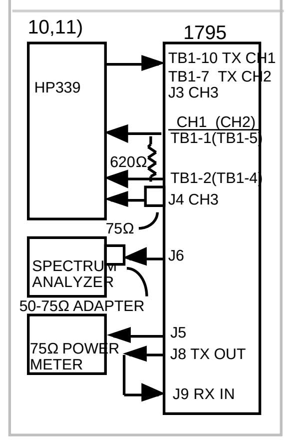
**7.)RX 12K FILTER** - Set **J2** in the **center to right** pin position. With Wavetek, input 1Khz, -14dbm (.43Vp-p) to **TP9**;Set **R190** for 200 mv p-p (-21.0dBm) output at RX CH 2, **TB1-2** (with 620Ω resistor between **TB1-1 & TB1-2**)(Or leave levels as in 6 and use -13 & -20)
Sweep 1 - 12Khz; Set **R165 R168 R115 R178** for ±0.5 dB response (1/2 division at 10mv/div). Check **TB1-1** for signal continuity.
At 1kHz in, set **R183** for 200 mv p-p( -21.0dBm) at **TB1- 4** (with 620Ω resistor between TB1-4 & TB1-5). Check **TB1-5** for signal continuity
Set **J2** in the **center to left** pin position.

**TEST SET-UPS**



**TEST SET-UPS**




**8.)TX LEVEL, CARRIER NULL AND FREQUENCY RESPONSE** - With Wavetek, input 10 KHz at -20dbm (0.076Vp-p) (measure -29dbm on 339 because of 600Ω meter but 75Ω load) to **TX Ch. 3, J3**;Output **J5** to spectrum analyzer, **J6** to 75Ω power meter. **J1 center pin to dot!**

Set **R55** for 800 mv p-p (-9.0dBm) at **TP2;**

Adjust **R292** (balance) and **R88** (LO phase) for > -30 dBm lower sideband rejection at **J6**.
Check for >-30db lower sideband rejection at 100 KHz. Return to 10 KHz.

Adjust **R276 & R250** for carrier null (>-70 dBm = >-56dBC))

Adjust **R306** for -16dbm carrier level as noted on 75 Ω power meter (=-16.9dBm on 50 Ω meter)
Sweep Wavetek 10 - 110 KHz. With spectrum analyzer on 2db/div note ±1db response at **J5**

**9.)TX AND RX SIDEBAND REJECTION** - Same set-up as step 8. Set Wavetek to 10 Khz.
With HP8640, input Fo + 10Khz at - 16 dBm (measure with power meter) via 50 -75Ω adapter to **J10.** HP 339 to **TP1**; measure 10Khz level (≈-10dbm) with Fo + 10Khz, -16 dbm in.

Tune HP8640 to Fo-10Khz, monitor **TP1** and set **Rl32** to get >-30 dBm relative to Fo +10Khz reference.Tune HP8640 to Fo-0.3Khz to Fo-12Khz and find frequency where rejection is worst (typically Fo-0.5 to -1.5Khz)

Adjust **R88** (Osc. phase) to meet both TX & RX SB rejection of >-30dbC (typ -35dbC on both)
Insure carrier power is still -16dbm. Adjust **R306** for -16dbm carrier level if needed.

**FINAL - PUT 1795 PCB IN THE CHASSIS IT SHIPS IN, REPEAT STEP 1 IF NEEDED, PUT TOP COVER ON.**

**10.)RX LEVEL SET; SYSTEM DISTORTION, NOISE FLOOR AND FREQENCY RESPONSE** Use HP339 as the generator and level meter. **Check continuity on ALL pins.**

Ch. 1- 1KHz - 14 dBm to TX **Ch. l(TB1-10)**.Set **R11** if needed to get -16dbm out at **J5**
Set **R183** for -14 dBM across **TB1-5 & -4** terminated in 600 ohms..
Measure <1% distortion (< -40 dB). Adjust input range switch to keep range lights off.
Remove 1 Khz tone; measure <-60 db on distortion meter. Use 80Khz LP on HP339.
Measure <±2.0 db at **TB1-4** unbalanced, 300Hz - 12 Khz.

Ch. 2 - 1KHz - 14 dBm to TX **Ch. 2(TB1-7)**.Set **R25** if needed to get -16dbm out at **J5**.
Set **R190** for -14 dBM across **TB1-1 & -2** terminated in 600 ohms..
Measure <1% distortion (< -40 dB). Adjust input range switch to keep range lights off.
Remove 1 Khz tone; measure <-60 db on distortion meter. Use 80Khz LP on HP339.
Measure <±2.0 db at **TB1-1** unbalanced, 300Hz - 12 Khz.

Ch. 3 - 10KHz - 20 dBm (will read -29dbm on 339 because of 600Ω meter but 75Ω load) to TX **Ch. 3 (J3)**. Set **R55** if needed to get -16dbm out at **J5**.
Set **R152** for -20 dBM out of **J4 terminated in 75 ohms** (will read -29dbm on 339 because of 600Ω meter but 75Ω load).
Measure <1% distortion (< -40 dB). Adjust input range switch to keep range lights off. (May need higher than -29 dBm for DIST measurement)
Remove 10 Khz tone; measure <-60 db noise floor relative to 10 Khz tone.
Measure <±2.0 db at **J4**, 16KHz - 110 Khz.

**11.) FINAL CARRIER NULL** Same set-up as step 10 with 10 Khz signal to TX CH3. Adjust **R276 & R250** for carrier null (>-70 dBm = >-56dBC)) at **J6**.

**12.) FINAL** - **AC sheild** with warning label installed (for AC only). All but front panel pots marked with “white out”. Front panel attached.