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# INSTRUCTION MANUAL

## MODEL 1200-03 IF PROCESSOR

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**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 not other warranties, express or implied, except as stated herein.

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01/08/09
1.0 General

1.1 Equipment Description - The 1200-03 IF Processor consists of a transmit and receive side. The receive side consists of one receive IF signal going through an Automatic Gain Control (AGC) amplifier and then split into three signals, DIG1RX, FDMRX, DIG2RX each having variable attenuators to adjust their levels over a 30dB output range via front panel multi-turn potentiometers. The AGC amplifier provides Automatic Gain Control for a 50 to 90 MHz IF signal for a -80 to 0 dBm input level to a -35dBm ±10dB output. A front panel monitor port provides a monitor signal out of the AGC amplifier.

The transmit side consists of three transmit IF signals combined into one. Transmit DIGTX, FDMTX, and DIG2TX signals each pass through individual attenuators controlled via front panel multi-turn potentiometers and a switch that is controlled remotely through a DB9 connector or locally with three 2PDT switches located on the front panel.

A 2PDT switch on the front panel selects either REMOTE or LOCAL operation. On the DB9 connector a closure to +V will turn the corresponding transmit channels on. A local override feature is included such that when the REMOTE/LOCAL 2PDT switch on the front panel is left in the LOCAL position, the override pin on the DB9 can be set to +V to override the LOCAL control and allow for REMOTE control. DIG1 and DIG2 on both transmit and receive sides are 75Ω in/out while FDM on both transmit and receive sides are 50Ω in/out. When power is removed from the 1200-03, the FDM TX and FDM RX signals pass through to the output.

The IF in and out connectors are BNC female. All circuitry is on a single PCB housed in a 1RU X 14” deep chassis. An internal switching power supply powers the unit with a 100-240 ±10% VAC, 47-63 Hz input.

![Model 1200-03 Front and Rear Panels](image)
1.2 Technical Characteristics

**TABLE 1.1 1200-03 IF Processor Specifications**

**RX Input Characteristics**
- Impedance/Return Loss: 50 Ω /18 dB
- Frequency: 50 to 90 MHz
- Input Level Range/1dB: 0 to -80 dBm / +5 dBm

**RX Output Characteristics**
- Impedance/Return Loss: FDM RX 50Ω / 18dB; DIG1, DIG2 RX 75 Ω/18 dB (with ≥ 5dB attenuation on each channel)
- Output Level, nom/max: -35 ± 10 dBm / -10 dBm
- Output Level Adjust: -35 to -65 dB ± 10 dB at -35 dBm nominal
- RX IF Mon Output Level: -35 ± 10 dBm

**RX Channel Characteristics**
- Gain, AGC: -35 to +45 dB range
- Frequency Response: ±1.0 dB

**TX Input Characteristics**
- Impedance/Return Loss: FDM TX 50Ω / 18dB; DIG1, DIG2 TX 75 Ω/18 dB (with ≥ 5dB attenuation on each channel)
- Frequency: 50 to 90 MHz
- Input Level Range: -20 to +5 dBm
- Input Level Adjust: 0 to -30 dBm with 0 dBm in

**TX Output Characteristics**
- Impedance/Return Loss: 50 Ω /18 dB
- Output Level Range/1dB: -50 to +5 dBm / +10 dBm

**TX Channel Characteristics**
- Gain Adjustment: 0 to -30 dB, each channel individually adjustable
- Frequency Response: ±1.0 dB
- Group Delay: 5 ns, max

**TX Switch Characteristics**
- Isolation, Switch off: ≥ 60 dB
- Isolation, Port to Port: ≥ 50 dB, all “ON” and ≥ 5dB attenuation on each channel
- Switch Time: ≤ 10 ms

**Controls, Indicators**
- **Front Panel Controls**
  - SW1, SW2, SW3
  - SW4
- **Front Panel Indicators**
  - DIG1, FDM, DIG2
  - OVERRIDE
  - LOCAL
  - DC
- **Front Panel Monitors**
  - J1, J2
- **Other**
  - IF Connectors
  - Connector, Control
  - Size
  - Power

*+10 to +40 degrees C; Specifications subject to change without notice*
FIGURE 1.2 Model 1200-03 Block Diagram
1.3 Use Information

A. Elevated operating ambient temperature - if installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack may be greater than room ambient temperature. Therefore, consideration should be given to Tmra.

B. Reduced air flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. Additional space between unit may be required.

C. Mechanical loading - Mounting of equipment in a rack should be such that a hazardous condition does not exist due to uneven weight distribution.

D. Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits could have on over current protection and supply wiring. Appropriate consideration of equipment name plate rating should be used, when addressing this concern.

E. Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connection to the Branch (use of power strips).

F. Top Cover - There are no servicable parts inside the product so, the Top Cover should not be removed. If the Top Cover is removed the ground strap and associated screw MUST BE RE-INSTALLED prior to Top Cover screw replacement. FAILURE TO DO this may cause INGRESS and/or EGRESS emission problems.
2.0 Installation

2.1 Mechanical - The 1200-03 consists of one PCB assembly and one power supply housed in a 1 RU (1 3/4 inch high) by 14 inch deep chassis. An AC power supply provides +15VDC and -15VDC to the PCB. The 1200-03 can be secured to a rack using the 4 holes on the front panel. Figure 2.1 shows how the 1200-03 is assembled.

![Diagram of 1200-03 Mechanical Assembly]

**FIGURE 2.1 1200-03 Mechanical Assembly**
2.2 Rear Panel Input/Output Signals and Controls - Figure 2.2 and Table 2.1 show the input, output, and control connectors on the rear panel.

![Diagram showing rear panel input/output signals and controls]

**TABLE 2.1 - J105 (DB9) Control/Indicator Signals**

<table>
<thead>
<tr>
<th>PIN</th>
<th>CONTROLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SELECT DIG1 TX IN</td>
</tr>
<tr>
<td>2</td>
<td>SELECT FDM TX IN</td>
</tr>
<tr>
<td>3</td>
<td>SELECT DIG2 TX IN</td>
</tr>
<tr>
<td>4</td>
<td>LOCAL Indicator OUT</td>
</tr>
<tr>
<td>5-9</td>
<td>GND Ground Reference</td>
</tr>
<tr>
<td>6</td>
<td>OVERRIDE IN Local Override Input</td>
</tr>
<tr>
<td>7</td>
<td>+V DC Voltage Reference</td>
</tr>
</tbody>
</table>

2.3 Front Panel Controls and Indicators - The following are the front panel outputs, controls and indicators.

![Diagram showing front panel controls and indicators]

**FIGURE 2.2 1200-03 Rear Panel I/Os and Control**

**FIGURE 2.3 1200-03 Front Panel Controls and Indicators**
2.4 Operation

2.4.1 Installing and Operating the 1200-03

1.) Install the 1200-03 in the equipment rack.
2.) Connect to signals on the CONTROL connector, J105, as desired (Figure 2.2).
3.) Connect 100-240 ±10% VAC, 47 - 63 Hz to AC IN on the back panel (Figure 2.2).
4.) Be sure the DC (power) LED, DS6, is on (Figure 2.3).
5.) Set SW4 for REMOTE or LOCAL operation (Figure 2.3).
6.) Choose the desired TX path(s) either remotely (J105, Figure 2.2) or locally using the front-panel switches (SW1 - SW3, Figure 2.3) and check for proper signal(s) at TX IF MON (J2, Figure 2.3) or TX IF OUT (J104, Figure 2.2) and that the appropriate LED(s) (DS1 - DS3, Figure 2.3) is lit.
7.) Adjust attenuator pots (R1, R2, R3, T1, T2, T3) as needed. Clockwise rotation provides increased output level (full clockwise = 0 dB atten, full counter-clockwise = 30 dB atten).
8.) AC Fuse - The fuse is a 5 mm X 20 mm, 2 amp slow blow (Type T) and is inserted in the far slot in the drawer below the AC input as shown in Figure 2.4. There is a spare fuse in the near slot. If a fuse continues to open, the power supply is most likely defective.

![Figure 2.4 Fuse Location and Spare Fuse](image-url)
2.4.2 AGC voltage relating to Gain - The 1200-03 IF Processor operates over a 0 to -80 dBm input range on the RX IF side. The Automatic Gain Control (AGC) provides a constant -35 dBm ± 10 dBm output RX IF level over the entire input range. Pin 7 of the DB9 control connector, J105, can be monitored to determine the approximate input level (and corresponding gain) in AGC as Table 2.2 shows.

<table>
<thead>
<tr>
<th>AGC Voltage (pin 7, J105)</th>
<th>AGC Gain</th>
<th>Input Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>+0.3 VDC</td>
<td>-35 dB</td>
<td>0 dBm</td>
</tr>
<tr>
<td>+0.1 VDC</td>
<td>-25 dB</td>
<td>-10 dBm</td>
</tr>
<tr>
<td>-0.7 VDC</td>
<td>-15 dB</td>
<td>-20 dBm</td>
</tr>
<tr>
<td>-1.4 VDC</td>
<td>-5 dB</td>
<td>-30 dBm</td>
</tr>
<tr>
<td>-1.8 VDC</td>
<td>+5 dB</td>
<td>-40 dBm</td>
</tr>
<tr>
<td>-2.1 VDC</td>
<td>+15 dB</td>
<td>-50 dBm</td>
</tr>
<tr>
<td>-2.3 VDC</td>
<td>+25 dB</td>
<td>-60 dBm</td>
</tr>
<tr>
<td>-2.5 VDC</td>
<td>+35 dB</td>
<td>-70 dBm</td>
</tr>
<tr>
<td>-2.7 VDC</td>
<td>+45 dB</td>
<td>-80 dBm</td>
</tr>
</tbody>
</table>