OPERATING AND MAINTENANCE

INSTRUCTIONS

MODEL CMC1000

WIDE BAND SOLID STATE AMPLIFIER

DOCUMENT NUMBER
CMC1000MN V1.0

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

SECTION 1.0

INTRODUCTION

Congratulations on the purchase of your new Wide Band Amplifier from Instruments For Industry, Inc. Your new Wide Band Amplifier incorporates the finest advancements in the state of the art solid state electronics technology available in a compact, portable and versatile package. Your Wide Band Amplifier's quality, performance and trouble free operation depends on you thoroughly reading through this manual and familiarizing yourself with its proper operation and usage.

Your Wide Band Amplifier comes with the following accessories, be sure to check your packaging for the items listed below before disposing of the packaging.

CONTENTS
(For a typical Wide Band Amplifier)

Quantity	Description
1	CMC1000 High Power Wide Band Amplifier, P/N CMC1000
1	MS AC Connector
1	Operation and Instruction Manual, Doc. No. CMC1000MAN
1	Amplifier Data Sheets (Included in Manual)

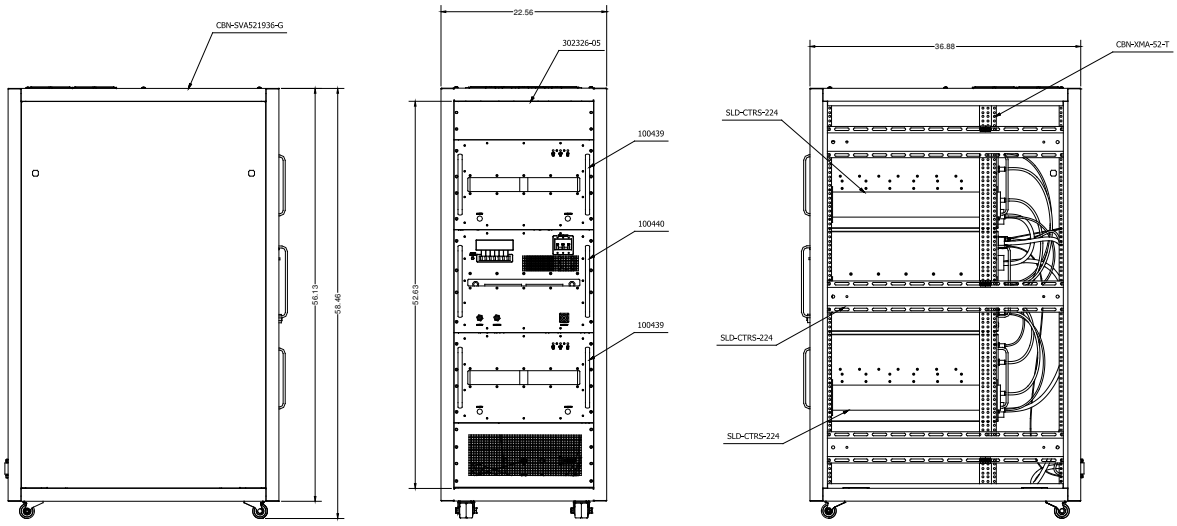

FIGURE 1.0
CMC1000 ILLUSTRATION

SECTION 2.0

GENERAL DESCRIPTION

The Instruments For Industry, Inc. (IFI) manufactured CMC1000 Wide Band Amplifier is a Bench Top or rack mount amplifier providing 1000 Watts of RF power from 80 MHz to 1000 MHz. The minimum saturated output power over the entire operating frequency range is more than 1000 Watts.

The CMC1000 features a Liquid Crystal Display (LCD) that displays continuous forward and reflected power in four digit metering. The display also scrolls to provide the operator with operating status and self diagnostic fault indications.

The CMC1000 has an internal electronic gain control of 40 dB and a built in leveling control which allows the CMC1000 to level on an external controlling signal or level internally by an operator determined the Automatic leveling Control (ALC) setting(Optional).

The CMC1000 is unconditionally stable and incorporates protection circuits that monitors and controls the VSWR input and outputs so the amplifier cannot be damaged by any mismatched load.

The CMC1000 has an optional IEEE-488 BUS interface which allows the amplifier to be remotely controlled through the use of as computer and a GPIB BUS.

A) Apply power to the unit using the front panel ON/OFF switch. Start.

Figure 2.0, Front Panel Display – Start-Up Menu

Start-Up Menu

When the circuit breaker or AC power on switch is energized, the above menu will be displayed after the MPU booting cycle. This menu displays the company information, the amplifier model number and serial number along with the firmware version used.
From this menu, by selecting the GPIB ADDR button a GPIB address can be set by the control knob as seen in figure 2. After the address is set, press the RETURN key to return to the main menu.

- Entering the GPIB Address

Figure 3.0 Front Panel Display – GPIB address Menu

The GPIB Address is entered by dialing in the desired number using the Control Level Adjust knob and pressing the RETURN button. The START-UP Menu in Figure 2.0 will be displayed after pressing the RETURN button.

Or, wait approximately 5 seconds (or press the Continue (CONT) button) for the Main Menu, as seen in Figure 4.0.

-Turning ON the Amplifier

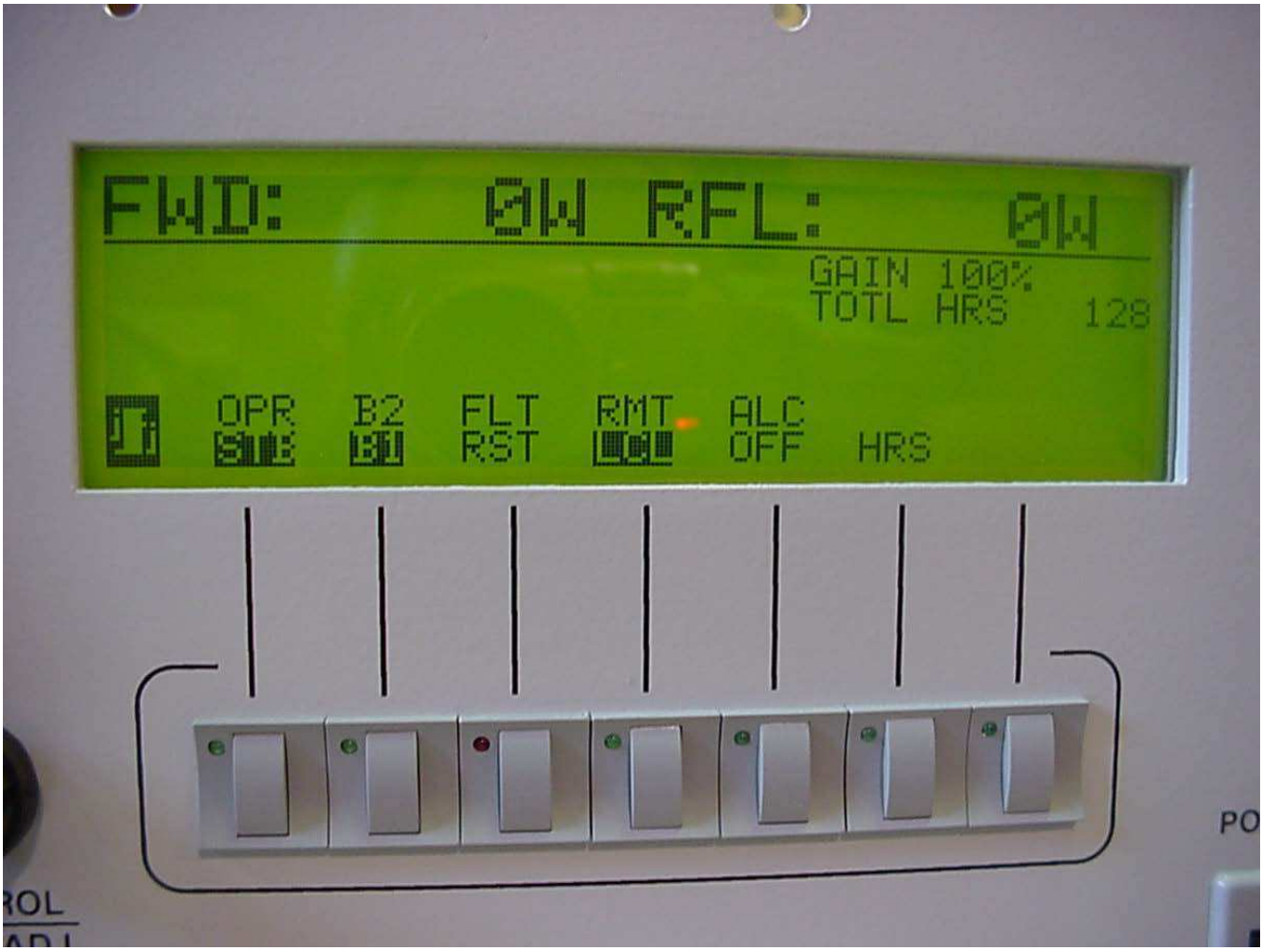

FIGURE 5.0 – MAIN MENU AND STATUS DISPLAY (Typical)

The amplifiers status can be monitored using the Main Menu. The Gain (GAIN), Total Hours (TOTL HRS), Operating Hours (OPRT HRS), Forward (FWD) and Reflected (RFL) statuses are continuously displayed.

Note: This is a typical display and the B1/B2 Switch is not required for this unit and will not apear will not apear on the CMC1000 display.

-Turning ON the Amplifier continued……

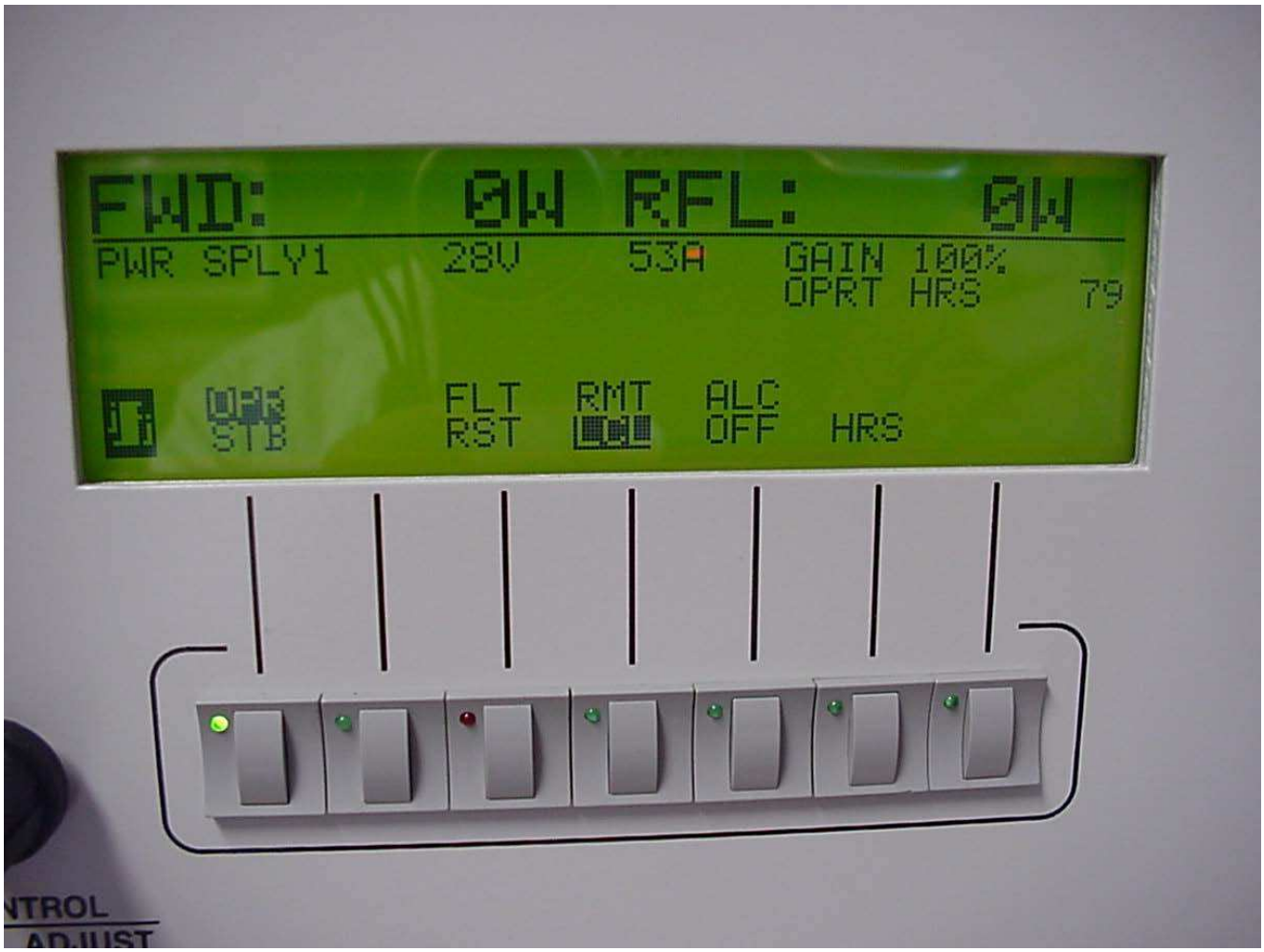

FIGURE 6.0 – TURNING ON THE AMPLIFIER (Typical)

1. From the MAIN MENU in Figure 6.0, press the button located under the Operate/Standby (OPR/STB) indication on the display. Place the unit in Operate (OPR) mode. At this mode the AMPLIFIER will be turned ON.

2. The display will show the Main DC power supply Voltage/s and current/s as per AMPLIFIER operating data sheet (enclosed in the manual).

SECTION 3.0

WARRANTY INFORMATION

Instruments For Industry, Inc. (IFI) warrants each product of its manufacture to be free from any defect in material and workmanship for a period of three years from shipment to the original purchaser. All warranty returns, however, must first be authorized by our factory office representative. Refer to the Service Section for information on how to return items for warranty repair.

Warranty liability shall be limited to repair or replacement of, or part thereof, which proves to be defective after inspection by IFI. This warranty shall not apply to any IFI product that has been disassembled, modified, physically or electrically damaged or any product that has been subjected to conditions exceeding the applicable specifications or ratings.

IFI shall not be liable for any direct or consequential injury, loss or damage incurred through the use, or the inability to use, any IFI product.

IFI reserves the right to make design changes to any IFI product without incurring any obligation to make the same changes to previously purchased units.

This warranty is the full extent of obligation and liability assumed by IFI with respect to any and all IFI products. IFI neither makes, nor authorizes any person to make, any other guarantee or warranty concerning IFI Products.

SECTION 4.0

GENERAL INFORMATION

4.1 SCOPE OF THIS MANUAL

This manual is intended to inform a qualified transmitter operator or technician of the normal operating and maintenance procedures for the CMC1000. It is not intended to be a course of instruction for unqualified personnel.

4.2 OPERATION OVERVIEW

The CMC1000 is an integrated system with a single capability for the frequency range required for operation. With the CMC1000 in, the input RF signal is directed to the PA and Driver section which in then to the output. Refer to Figure 4.1, for the System Block Diagram.

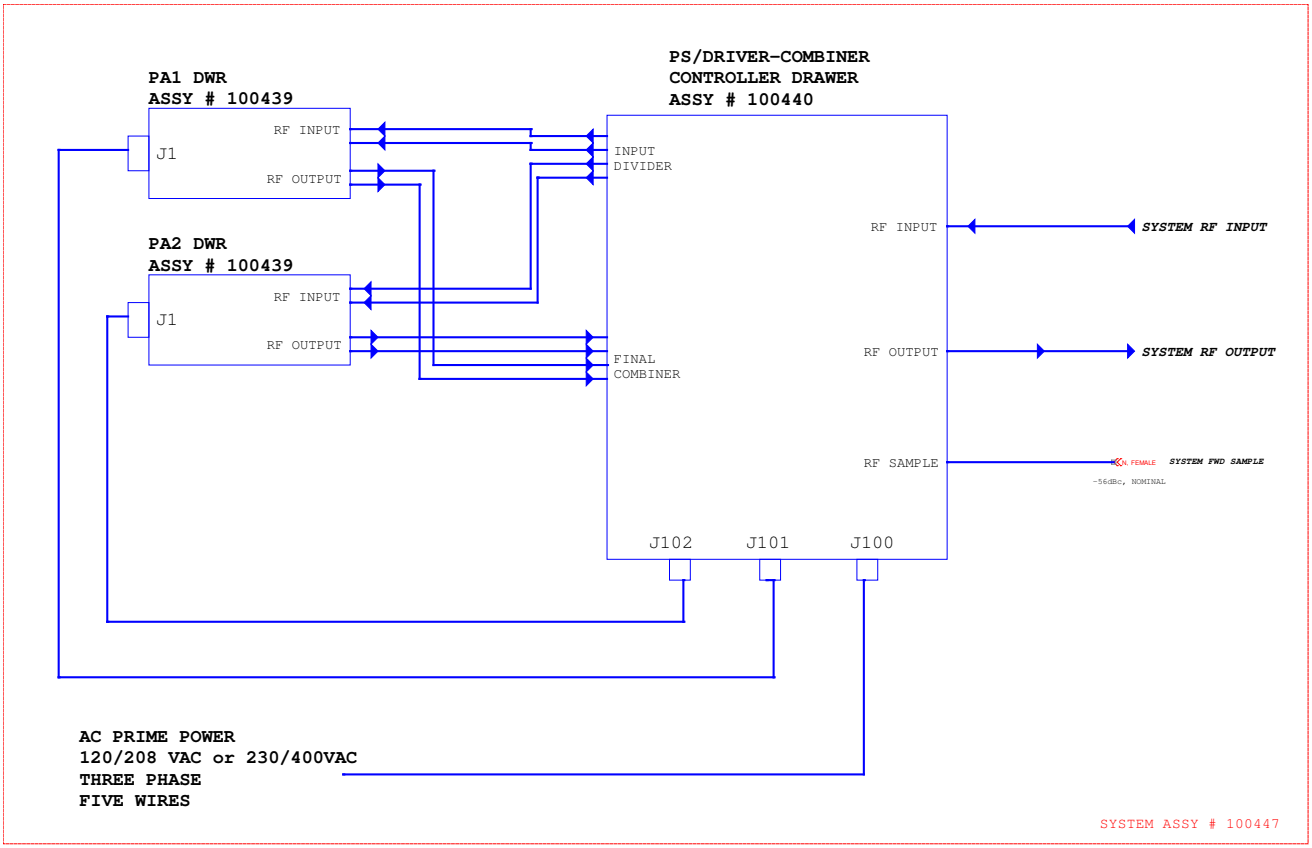

FIGURE 4.1
SYSTEM BLOCK DIAGRAM

4.3 Not Used

4.4 GENERAL SPECIFICATIONS

The specifications listed below represent the minimum performance characteristics at the time of delivery.

SPECIFICATIONS

Frequency Response:	80 MHz – 1000 MHz
Bandpass Ripple:	± 3 dB nominal
Power Output:	Minimum 1000Watts
Power Gain:	60 dB (minimum)
Input Impedance:	Nominal 50 Ohms unbalanced
Output Impedance:	Nominal 50 Ohms unbalanced
Input Signal Levels:	< 0 dBm (1.0 mW) See data sheet for specific input drive levels
Harmonic distortion:	< -20 dBc at 700 Watts
Gain Adjustment:	Greater than 40 dB (voltage controlled) when using Level Adjust.
Duty Factor:	No limitation

4.5 PROTECTION CIRCUITS

The CMC1000 is designed with a variety of protection circuits to provide safeguards for the amplifier should any adverse electrical conditions occur or if the amplifier accidentally experiences operator deviation of the design application. Listed below are the safeguards built into the CMC1000.

4.5.1 Over Heat Protection

The CMC1000 critical components are mounted to heat sinks which are, in turn, air cooled by four fans. Should an over heating condition occur, either through component failure or by a restricted air flow, the CMC1000 contains heat sensors that will shut down the system. As a result, the air inlet and outlet openings should be free of obstructions for proper cooling of the amplifier. Operation is restored automatically when the amplifier cools to normal temperature levels.

4.5.2 Input Protection

The CMC1000 is designed to operate with less than a 0 dBm (1.0 mW) input signal. However, to prevent overdriving the amplifier, the Input Protection circuit will activate if the input signal exceeds 3 dBm (2.0 mW) and will automatically compensate for the increased input signal by reducing the gain of the preamplifier. Even though the amplifier has an Input Protection Circuit, overdriving the amplifier is not recommended, refer to paragraph 5.1.2 for more details.

4.5.3 Output Protection

The CMC1000 incorporates a microprocessor controlled Output Protection Circuit which monitors the Forward Power Meter indication and limits the out put power to 1100 Watts. This feature protects the amplifier from being over driven and causing damage to the power transistors.

4.5.4 Power Supply Faults

The Power Supply Fault circuit monitors the 28 VDC power supply and produces a fault indication should any voltage level deviate from normal operating parameters. Should the power supply voltage deviate from the design parameters, the Fault Indication LED, located on the front panel is illuminated RED.

4.5.5 Mismatch Protection

The CMC1000 is designed to operate with a tuned 50 Ohm load and should any mismatching of the 50 Ohm load occur, the Reverse Power, also called Reflective Power, will increase producing a high VSWR. The CMC1000 microprocessor monitors the Reverse Power levels by utilizing a Dual Directional Coupler and begins to turn down the gain of the preamplifier when the Reflected Power exceeds 25%. The Reverse Power is also displayed on the LCD Display for operator monitoring for any mismatched load.

4.5.6 Not Used

4.5.7 Short Circuit Protection

The CMC1000 utilizes three different power supply voltages, + 28 VDC, ± 12 VDC and the +5VDC, each of the power supplies are designed with a short circuit and overload protection device.

4.6 STATUS INDICATORS, CONTROLS AND CONNECTORS

The CMC1000 has various controls and status indicators which are identified below and can be visually located on Figure 1.0, CMC1000 Illustration and Figure 3.0, CMC1000 Rear Panel Illustration. A narrative description for the function and purpose of each control and status indicator is provided within paragraphs 4.6.1 and 4.6.2.

CMC1000 RF AMPLIFIER

Front Panel:	Rear Panel:
	AC PWR, MS Connector
Local/Remote Switch	
Amp ON / OFF Switch	
Operate / Standby Switch	Fault/Reset Switch
FWD Sample Port, N Type	INTERLOCK, BNC Type
Control Knob	IEEE-488 & RS232 Connectors
LCD Status Display	ALC INPUT, BNC Type
RF IN, N, Type Female	
RF OUT, 7/16 Type Female	

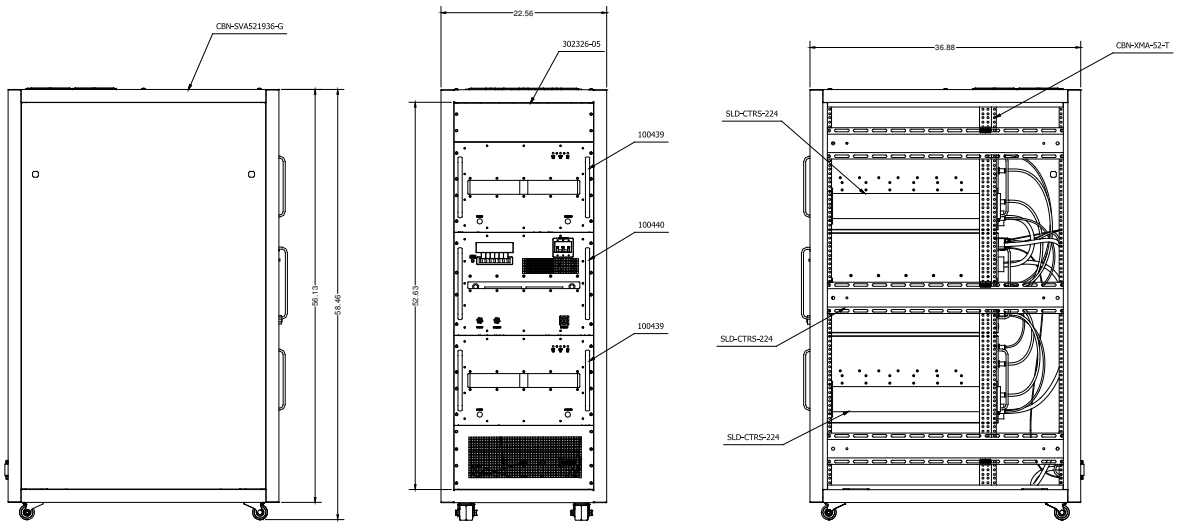

FIGURE 8.0
CMC1000 REAR PANEL ILLUSTRATION

4.6.1 CMC1000 PANEL STATUS INDICATORS

INDICATOR	FUNCTION
Fault LED	The Fault LED illuminates when either a Thermal or Power Supply Module Fault occurs. A Thermal Fault occurs when the amplifier is operating outside design temperatures. Should an excessive temperature condition occur, the + 28 VDC Supply is shut down and the +28 Green LED will extinguish. Once the thermal condition returns to operational limits, the Fault LED will extinguish, the +28 VDC ill activate and the +28 Green LED will illuminate. A Power Supply Fault is illuminated when the +28 VDC Power Supply voltage shuts down. The + 28 Green LED will extinguish when this failure condition occurs.
Hi VSWR	When the Hi VSWR is indicated, the amplifier is subjected to a condition where the Reflected Power exceeds 25%. The microprocessor turns down the gain of the preamplifier and displays the Reverse Power on the LCD Display.
GPIB Remote	The GPIB Green LED indicates, when illuminated, that the amplifier is in the remote control mode of operation via the IEEE-488 GBIP Bus. The address selection can be done through the front panel using the Control Knob, follow instruction on the LCD display.
Total/Oprt HOUR	Elapsed time Indication on the LCD display, presents total hours of the amplifier or the operate hours the amplifier has been energized .

4.6.2 CMC1000 CONTROLS

CONTROL	FUNCTION
Local	The Local switch is a momentary GPIB Rest switch. When depressed, the amplifier is restored to the local control from the GPIB mode of control.
ALC Switch	Automatic Leveling Control (ALC) is a three position switch which selects the method for leveling; either internal, external or manual.
Power ON/OFF	The Power On/Off switch is circuit breaker that is used as an On/Off switch as well as a circuit protection device. This switch turns the AC Power either on or off.
Level Adjust	The Level Adjust control is a ten turn pot which allows a minimum of a 40 dB range of gain. Turning the control Clockwise, (CW), produces a maximum gain.

4.7 DATA SHEETS

Provided with each CMC1000 are specific Amplifier Data Sheets measured from the amplifier using a calibrated 50 Ohm Pad to assist the operator in maximizing the performance of the Wide Band Amplifier.

The accuracy of the Metering is ± .5 dB (nominal) so to provide the operator with the ability to maximize the performance of the wide band amplifier, Amplifier Data Sheets are provided with each amplifier exhibiting the actual metering indication required to produce a 1000 Watt output. The actual metering values were derived by measuring the power output of the amplifier using a calibrated Power Meter and a calibrated 30 dB Attenuator Pad by inducing an appropriate input signal level to obtain a 1000 Watt output. Once the appropriate signal level has been determined to obtain the 1000 Watt power level, the actual Front Panel Metering Indication that correlates to the calibrated 1000 Watt indication was recorded for operator reference.

The amplifier data sheets provide the operator with the over all frequency response of the amplifier in perspective to the amplifier operating frequency range. The amplifier data sheets provide the operator with the actual gain of the amplifier over the frequency band.

The Amplifier Data Sheets are located within Appendix A

SECTION 5.0

PRINCIPLES OF OPERATION

5.1 PROPER USAGE AND WARNINGS

5.1.1 Controlling Power Output

With a nominal 50 ohm resistive load and an input signal appropriate to produce a power output within the limitations specified above, the amplifier may be placed in operation. To interrupt the output, simply interrupt the input signal or increase the input attenuation setting to produce commensurate output level reduction. The amplifier may be run indefinitely at rated output. Output power is usually measured with a power meter and suitable power attenuators.

5.1.2 Input Signal Levels

The CMC1000 is designed to operate with less than a 0 dBm (1.0 mW) input signal however, to prevent over driving the amplifier, the Input Protection circuit will activate if the input signal exceeds 3 dBm (2.0 mW) and will automatically compensate for the increased input signal by reducing the gain of the preamplifier.

It is not advisable to over drive any amplifier and depend on protection circuits to maintain proper gain control. IFI makes available with each shipped specific amplifier data so the operator will know the proper input signal levels to more efficiently operate the amplifier, refer to Paragraph 4.7 herein.

5.1.3 Not Used

5.1.4 Sample RF Output Cautions

The CMC1000 Sample RF Output connector located on the rear panel must be terminated with the supplied 50 Ohm load if the output is not being used. Should the CMC1000 be operated without a termination on the Sample RF Output connection, the lack of loading will jeopardize the accuracy of the metering and output protection, which are based on the Forward Power Readings.

5.2 FEATURES OF THE CMC1000 AMPLIFIER

The CMC1000 amplifier is intended for applications requiring high gain and power output to 1000 Watts, over a wide range of frequencies, without tuning adjustments. the CMC1000 amplifies a input signal source over the frequency range from 80 Mhz to 1.0 GHz and at a minimum gain of 59 dB. Refer to Figure 4.0, CMC1000 Schematic Diagram for an illustration of the CMC1000 circuitry.

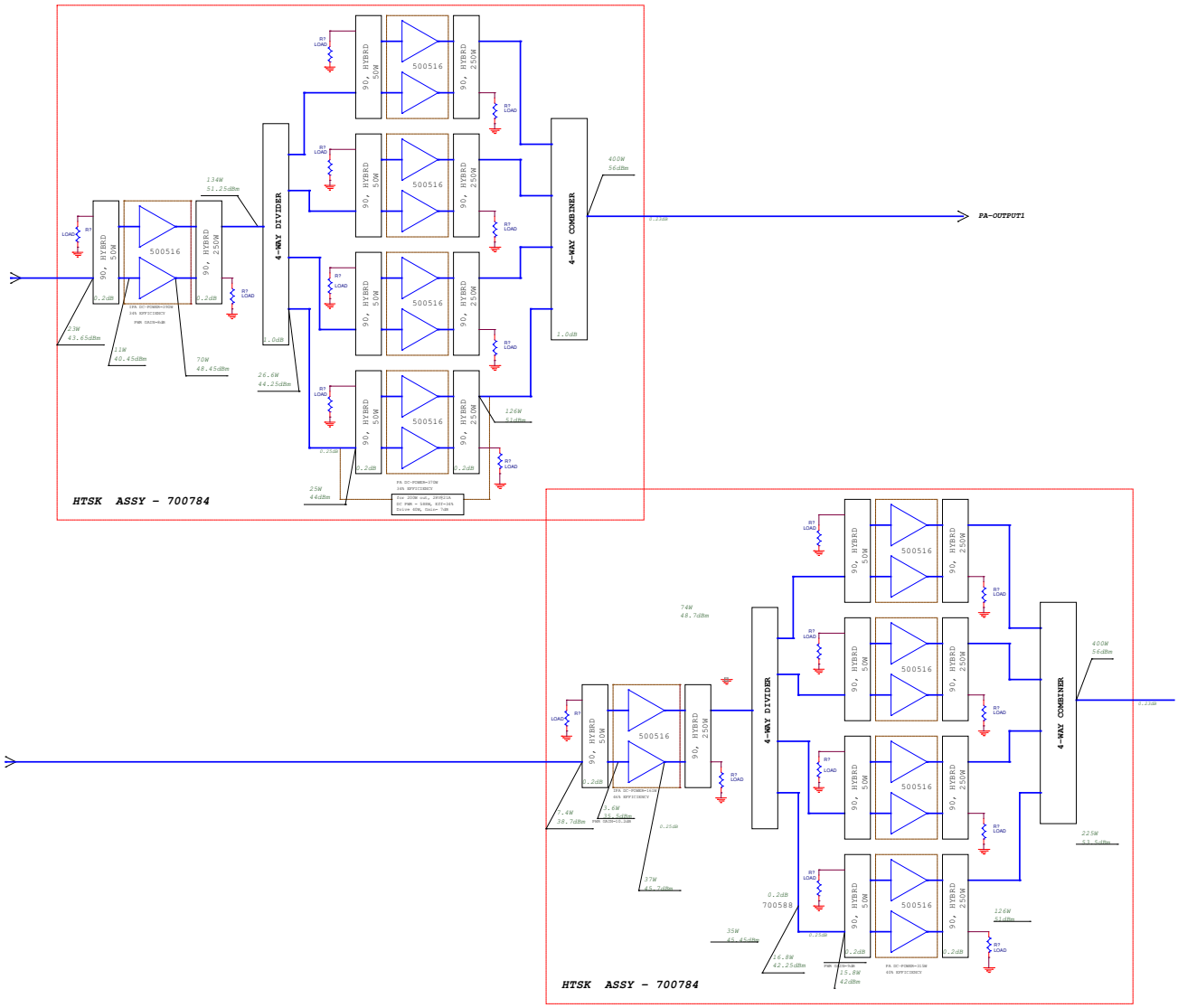

FIGURE 9.0
CMC1000 SCHEMATIC DIAGRAM

5.2.1 Preamplifier / Attenuator

This module is both a preamplifier and a voltage controlled, broad band attenuator. It provides the CMC1000 with remote level control and leveling capability over the entire 80MHz to 1.0 GHz frequency range. With the front panel level control set at maximum output it has a nominal 40 dB gain and can be adjusted with the front panel level control over a greater than 40 dB range.

The preamplifier is powered from a low voltage power supply that is independent of the main power supply.

5.2.2 Power Amplifier

This amplifier consists of three amplification sections, the final stage having two cascaded high-power, push-pull devices operating in parallel and combined through a transmission type impedance transformer.

5.3 Manual Level Control

Manual level control is accomplished by adjusting the front panel ten turn potentiometer, located on the power supply control unit, to a reference voltage setting between 0 to 5 volts.

5.3.1 Automatic Level Control

In this mode, the CMC1000 serves as the voltage comparator and variable gain stage. It will enable the maintaining of a constant RF voltage vs. frequency at the input to an imperfect load or a virtually constant E-Field at a measurement point in space. For further information regarding the ALC operation, refer to Section 6.0.

5.4 OPTIONAL FEATURES

5.4.1 Door Ajar Feature

The Door Ajar Feature is an option for the CMC1000 that utilizes an Electro Magnetic Interference (EMI) Testing Room door switch that is mounted to the door in such a manner that when opened, the switch will automatically induce an ordered shut down of the amplifier and produce a STAND-BY MODE indication on the LCD Metering Display. When the door is closed, the amplifier resumes previous testing conditions.

The advantage to this feature is providing an additional safety feature for the growing concerns for potential hazards due to exposure to EMI Fields. With the Door Ajar option, all Testing Personnel will be protected from accidental exposure to EMI Fields. Should the operator desire this optional feature, the amplifier can be returned to IFI for installation. Refer to Section 8.0 for Equipment Return Procedure.

SECTION 6.0

AUTOMATIC LEVELING CONTROL

6.1 ALC FEATURES

The Automatic Leveling Control (ALC) switch located on the front panel has three positions, 'INT', 'OFF' and 'EXT'. Described below are the features of each position

6.1.1 The 'INT' Position

The 'INT' or Internal position enables the amplifier to automatically level on an RF power level selected by an operator displayed on the Forward Power reading located on the Front Panel LCD display. Using the 'INT' feature, no external sources are required for leveling control and the operator determined power level will be automatically maintained even though the frequency or input signal levels might change. Refer to Paragraph 6.2 for the procedure to operate the amplifier in the 'INT' mode.

6.1.2 The 'OFF' Position

The 'OFF' position enables the amplifier to operate in a passive mode with no automatic features controlling input drive levels or output power levels. In this mode, the operator has full manual control of the amplifier including the input signal gain, frequency and power output. As a result, the operator must be fully knowledgeable of the effects of these variables in relationship to the operating characteristics of the amplifier. With this in mind, the two most important factors are the dB flatness of the amplifier over the operating frequency range and the rated output power of the amplifier.

Depending on the response curve provided on the S21 Parameter Plot for the amplifier flatness, which is located within Appendix A, and the size of the frequency steps of the signal generator can increase or decrease the power level by as much as 4 dB. This is the result of the design tolerance of the amplifier to operate within a ± 2 dB over the rated frequency range. A ± 2 dB tolerance means that the maximum deflection from minimum to maximum of the flatness curve can represent a delta change up to 4 dB. With this factor in mind, it is advisable to identify the specific frequencies that represent the greatest change from the nominal 0 dB level and adjust the input signal accordingly in so that the amplifier is not over driven beyond the rated power specification. Taking these precautions will prolong the reliability on the amplifier.

6.1.3 The 'EXT' or External Position

The CMC1000 serves as the voltage comparator and variable gain stage. It will enable the maintaining of a constant RF voltage vs. frequency at the input to an imperfect load or a virtually constant E-Field at a measurement point in space.

The front panel, ALC control, switches direct level control from the front panel Level Control potentiometer to the output of a linear comparator. The comparator output level is dependent on the reference input from the front panel Level Control and the input from the aforementioned detected voltage or E-Field. The total gain of the leveling loop serves to maintain the output of the comparator virtually constant and thus maintain the desired test level at the remote detector or remote E-Field sensor.

The 'EXT' position enables the amplifier to automatically control an operator determined power level by means of an external 0.0 to 5.0 VDC reference source connected to the External Source connector. An example of a 0.0 to 5.0 VDC external input would be the output of a LDI or an EFS. Refer to Paragraph 6.3 for procedures on leveling with an external voltage level.

6.2 LEVELING USING THE 'INT' MODE

When in the INT position, no outside controls are required, the only equipment required is a frequency generator and the intended load. The procedure to use Internal ('INT') Leveling is described below:

1) Turn the RF Level Potentiometer fully counter clockwise to Full Attenuation.

2) Set the ALC Switch to the 'INT' position.

3) Set the Signal Generator to the proper input drive level to obtain the desired power level. Identify the desired testing parameters and determine the required input drive levels from the Amplifier Data Sheets provided within Appendix A It is important to determine that sufficient signal drive signal is generated to obtain and maintain the desired programmed power level. An adequate load capable to operate within the power requirements should also be selected.

4) Adjust the RF Level Potentiometer until the desired Forward Power Level is displayed on the front panel LCD display.

5) The amplifier is now ready to sweep a frequency range and automatically maintain the desired power level with no further adjustments required. The power level will be maintained at the operator set level and remain independent of changes to the input frequency or input signal level.

6) When sweeping the frequency range, best results are obtained at a sweep rate that is slower than 500 ms.

6.3 LEVELING USING THE 'EXT' MODE

When operating the amplifier in the External (EXT) mode, it is important to understand that the power output levels are determined by the external voltage reference source and that the applicable Amplifier Data Sheets should be reviewed to determine the appropriate drive signal level so that the amplifier does not exceed the specified power output rating. As described in paragraph 6.1.2, due to the flatness curve tolerances at certain frequencies, the rated power output could be exceeded by an additional 40% and jeopardize the longevity of the amplifier. The amplifier should not be over driven. Should a particular application require additional power beyond the rated power of the CMC1000, contact IFI's Customer Service for additional high powered amplifiers.

Detailed below are specific applications for using the External (EXT) Mode with a variety of external inputs.

6.3.1 Constant RF Voltages Verses Frequency At A Remote Load

With remote detectors suitably rated for power and frequency, the CMC1000 provides the means for feeding a mismatched load with constant RF drive voltage over the entire frequency range. Full leveling, at half the CMC1000 rated output power, is realizable with most reasonable load variations. Extremely mismatched loads, particularly those presenting near short circuit conditions to the amplifier, will reduce the maximum voltage leveling capability of the system. Load impedance variation from 50 Ohms to an open circuit will permit peak voltage leveling within the VSWR capability of the amplifier. Variations in impedance from 50 Ohms down to a short circuit will rapidly diminish the peak voltage leveling capability toward zero. Amplifier VSWR limitations will, of course, further limit the maximum leveled voltage into mismatched low impedance loads.

To operate in this mode, after selecting the desired band, place the ALC switch in the EXT position. Connect the ALC on the rear panel to the detected output port on the remote detector. Connect the remote detector in series with the CMC1000 output and at the input to the load. The system is now ready for operation. Amplitude adjustments can be made with the level control as in manual operation.

NOTE: When the CMC1000 is used as a driver for higher power amplifiers, automatic level control can be accomplished in the same manner but at the power and frequency limitations of the driven amplifier.

Section 7.0

REMOTE INTERFACE

7.1 INTRODUCTION

The Instruments For Industry, Inc. (IFI) Amplifiers can be operated remotely from a personal computer having an IEEE-488 interface. This interface allows the amplifier to be remotely controlled over the General Purpose Interface Bus (GPIB) by sending commands to the amplifier. Additionally, amplifier status and forward and reverse power readings may be read over the GPIB. All functions can be controlled by coded messages sent over the interface bus via the 24-pin socket connector on the rear panel of the unit. IEEE-488.2 Standard is implemented, which defines the protocols and syntax of commands. The GPIB command codes for the IFI Amplifier series are discussed on subsequent pages and, for ease of identification; the command codes are identified within the text by bold capital characters. For full information on the IEEE protocols and syntax the IEEE-488.2 Standard should be consulted.

7.2 REMOTE INITIALIZATION

When the amplifier receives a command over the GPIB, it automatically switches to REMOTE operation, pressing the LOCAL key on the front panel returns the unit to normal manual local operation. The initial state of the amplifier after power-on is the full attenuation condition. The ZEROATT command must be sent in order for the amplifier to be able to generate output power.

7.3 GPIB ADDRESS

The GPIB address of the amplifier is set by via the Front panel using the Control knob at the start up menu..

NOTES ON USING NATIONAL INSTRUMENTS' GPIB CONTROLLERS:
In order for the amplifier to operate correctly with a National Instruments GPIB controller card, the following must be done: (Items 1-5 are done in the IBCONF program.)

1. Set "Terminate reads on **EOS**" to **yes**.

2. Set "Set **EOI** with **EOS** on Writes" to **yes**.

3. Set the **EOS** byte to **0Ah** (an ASCII line feed character).

4. Set "Send **EOI** at end of writes" to **yes**.

5. Set "Enable **repeat addressing**" to **yes** at the board level.

6. When sending command strings to the amplifier, a carriage return character (**0Dh**) followed by a line feed character (**0Ah**), must always be appended to the command, otherwise the amplifier will wait indefinitely for the **CR-LF** combination. If this happens the unit will have to be powered off

and back on to reset this condition. (The interface device will automatically assert the **EOI** line during the **LF** if items 2 - 4, above, are set to yes in the IBCONF program.) As an example, when issuing the zero attenuation command using the IBIC or WIBIC program, the command string would look like this: "**ZA\r\n**". (The \r is National Instruments' notation for the carriage return, and the \n is the line feed or 'new line' character.) Notice that the commands are upper case only.

Code	Amplifier Function
STBY	Standby & Returns '**SB'**
OPRT	Operate & Returns '**ON'**
RESET	Fault Reset & Returns '**STANDBY'**
ATTU	Increase Attenuation [Response with Gain value, **'GAIN: XXXXX %'**]
ATTD	Decrease Attenuation [Response with Gain value, **'GAIN: XXXXX %'**]

REQUEST STATUS

Code	AMPLIFIER STATUS
STATUS	
	STANDBY
	OPERATE
	FAULT
FAULT	**DETIALED MESSAGE**
	THERMAL FAULT
	PWR SUPPLY 1 FAULT
	PWR SUPPLY 2 FAULT, [If Applicable]
	PWR SUPPLY 3 FAULT, [If Applicable]
	PWR SUPPLY 4 FAULT, [If Applicable]
	NO FAULTS

REQUEST AMPLIFIER STATUS
(POWER AND METERING)

CODE	Amplifier FUNCTION
POWERFWD	Returns Forward Power Value in Watts, **'POWER FWD: XXXXX W'**
POWERRFL	Returns Reflected Power Value in Watts, **'POWER RFL: XXXXX W'**
PS1V	Returns Power Supply 1 Volts Value in Volts, **'PWRSPLYV1: XXXXX V'**
PS1I	Returns Power Supply 1 Current Value in Amps, **'PWRSPLYI1: XXXXX A'**
PS2V	Returns Power Supply 2 Volts Value , [If Applicable]
PS2I	Returns Power Supply 2 Current Value [If Applicable]
PS3V	Returns Power Supply 3 Volts Value , [If Applicable]
PS3I	Returns Power Supply 3 Current Value [If Applicable]
PS4V	Returns Power Supply 4 Volts Value , [If Applicable]
PS4I	Returns Power Supply 4 Current Value [If Applicable]
TOTALH	Returns Total hours unit is on, **'TOTAL HRS: XXXXX'**
OPERATEH	Returns Operation Hours Value, **'OPERATE HRS: XXXXX'**
BAND1	Selects Band 1 of Operation [In Dual Band units only]
BAND2	Selects Band 2 of Operation [In Dual Band units only]
NOLEV	Selects NO Leveling [Optional]
INTLEV	Selects INTERNAL Leveling [Optional]
EXTLEV	Selects EXTERNAL Leveling [Optional]
QUIETOFF	Selects QUIETING to OFF [Optional]
QUIETAUTO	Selects QUIETING to AUTO mode [Optional]
QUIETSTATUS	Returns Quieting mode of operation [Optional] **'QUIETING OFF'** **'QUIETING AUTO'**
ZEROATT	Sets the Amplifier for ZERO Attenuation & Returns, **'GAIN: 00100 %'**
FULLATT	Sets the Amplifier for FULL Attenuation & Returns, **'GAIN: 00000 %'**
GAIN	Returns Gain Value in percentage, **'GAIN: XXXXX%'**
MODEL	Returns Model number of the unit
SN	Returns Serial number of the unit
***IDN?**	Returns ASCII response comprising of four data fields in the format <Manufacturer>, <Model>, <Serial Number>, <Firmware Version>
***RST**	Reset Command, Sets the Amplifier to the factory default power up state (reboots MPU)

NOTES:

1. ALL GPIB COMMANDS AND REQUESTS MUST CONSIST ENTIRELY OF UPPER CASE ALPHANUMERIC CHARACTERS.

2. WHEN SENDING COMMAND STRINGS TO THE AMPLIFIER, A CARRIAGE RETURN CHARACTER (**0Dh**) FOLLOWED BY A LINE FEED CHARACTER (**0Ah**), MUST ALWAYS BE APPENDED TO THE COMMAND, and OTHERWISE THE AMPLIFIER WILL WAIT INDEFINITELY FOR THE **CR-LF** COMBINATION.
3. ALL VALUES DISPLAYED DO NOT SHOW THE ZEROS TO THE LEFT OF THE NUMBER VALUE.

RS-232

Operation of Serial Port on RF Amplifier

1 – Connect serial port of amplifier to computer using a null modem cable or a standard serial cable with a null modem adapter.

2 – Use a program such as Hyperterm to communicate with the amplifier. (To reach "Hyperterm" on windows '98 go to Start → Programs → Accessories → Communications → Hyper Terminal. In Hyper terminal double click on

In Hyperterm do the following:

2.1 Enter a name and choose an icon.
2.2 In the connect using box select "Direct to Com1".
2.3 Click OK.
2.4 Select 9600 baud.
2.5 In Data Bits select 8
2.6 In Parity Select "None"
2.7 In Stop bits select "1".
2.8 In Flow control select "None"
2.9 Press enter.

3 – If you use Hyperterm steps 2.1 to 2.9 will set up Com1 to communicate at 9600 baud, 8 bits, and no parity with 1 stop bit.

4 – Turn amplifier line power ON.

To place the amplifier in remote operation type in a valid command such as "STATUS". The amplifier will then go into remote operation and the status will be displayed on the computer. The same commands as above.

5 – When used with an RS-232 or RS-422 interface each character that is sent to the amplifier is echoed back.

RS-422

Communication Interface

Communication Standard	RS422
Communication Baud Rate	19200
Communication Update Rate	50 Hz
Average Data Latency	100 mSec
Data Latency Variation	100 mSec
Control Functions	Status Request, Mode Selection, BIT activation
Report Data	Amplifier Status, BIT results

Data rate is 9600 baud, 1 or 2 stop bits, no parity.

Example

The commands are the same as above.

Command: Place unit in operate mode
ASCII String sent to amplifier: OPRT(cr)(lf)
Hex equivalent of string: 0x4f, 0x4e,0x0d,0x0a
Response: None
Response String from amplifier: None
Example of response: N/A
Hex value of example: N/A

Command: Read forward power
ASCII String to amplifier: POWERFWD(cr)(lf)
Hex equivalent of string: 0x50,0x4f,0x57,0x45,0x52,0x46,0x57,0x44,0x0d,0x0a
Action: None
Response: Responds with forward power
Response String from amplifier: POWER FWD: xxxxx W(cr)(lf)
Where xxxxx is the value of the power
Example of response : POWER FWD: 09005 W(cr)(lf)
Hex value of example :
0x50,0x4f,0x57,0x45,0x52,0x20,0x46,0x57,0x44,0x3a,0x20,0x30,0x39,0x30,0x30,0x35,0x20,0x57,
0x0a,0x0d

SECTION 8.0

MAINTENANCE AND SERVICING

8.1 PERIODIC MAINTENANCE

The only periodic maintenance required on the CMC1000 amplifier system is insuring that the cooling vents are not obstructed in such a manner that the air flow is restricted. Periodic cleaning of the vents may be required depending on the degree of dust in the atmosphere.

8.2 SERVICING THE AMPLIFIER

Servicing of the amplifier by the operator is not recommended. Most of the internal circuitry requires special and unique test instruments to trouble shoot, align and calibrate the circuits. Should servicing be required, refer to Paragraph 8.3.

8.3 EQUIPMENT RETURN PROCEDURE

Should such an event arise that the CMC1000 requires repair or Amplifier, it is recommended that the reader follows the Equipment Return Procedure so the equipment can be repaired or calibrated and returned in a efficient and timely manner.

8.3.1 Request a RMA Number

Contact the IFI Service Department either in writing or by calling (631) 467-8400 and request a Return Material Authorization (RMA) Number, or, go to our website www.ifi.com and click on the RMA link.

The RMA Number is the method IFI uses to prepare its' services for returned material in transit and acts as a tracking document for the returned material through the repair or calibration process.

The RMA also documents the customers' specific instructions or reason related to the return of the material.

8.3.2 Return All Accessories

In the interest of saving time and expediting the repair or calibration process, return all the associated accessories described in Section 1.0 when returning the equipment for repair or calibration.

In many cases, a faulty accessory could give an illusion that the equipment itself has failed. For this reason it is important to return the all the accessories with the equipment. It is also IFI's policy to verify performance of all associated accessories of Section 1.0 before returning the equipment to service.

8.3.3 Packaging The Equipment

When returning equipment to the manufacturer, always wrap each accessory separately and provide sufficient protective material around each item to prevent damage from handling and shipping conditions.

8.3.4 Reference The RMA Number

As detailed in Paragraph 8.3.1, always reference the IFI assigned RMA Number on your Packing List and Purchase Order and also when any inquiries are made.

APPENDIX A

AMPLIFIER DATA SHEETS

APPENDIX B

DRAWINGS

900889	**INTERCONNECT DIAGRAM**
CMC1000	**BOM**
100447	**OUTLINE DRAWING**
100216	**ATTENUATOR PRE-AMPL. ASSEMBLY DRAWING**
500466	**SCHEMATIC POWER VSWR METERING BOARD**
500516	**SCHEMATIC, HB DUAL PA/IPA**
500599	**SCHEMATIC, DRIVER**
100439	**PA DRAWER ASSY**
100440	**PS/COMBINER DRAWER ASSY**
500523	**HALLEFFECT SENSOR BD**
500466	**POWER MONITORING BD**
500440	**PS CONTROL BD**