RM1200
1kW Power Amplifier Option
Owner's Guide

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Introduction

This manual covers the installation and operation of the MICOM RM1200 1 kW linear high-power RF amplifier unit, FLN3175. RM1200 uses the MICOM RM125 or RM125R, part of the MICOM-3 line of HF-SSB radio sets, as exciter and controller to implement a complete 1 kW transceiver.

The manual covers only procedures specific to the MICOM RM1200. For procedures related to the RM125 and RM125R, refer to the "RM125/RM125R Owner's Guide", Publication 6888882V02. The other procedures, which are common to the whole MICOM-3 product line, are described in the "Owner's Guide, MICOM-3F/3T/3R HF-SSB Transceivers", Publication 6886867J01, and in other MICOM-3 Supplements that cover optional features applicable to your radio set.

Note *If you are using a different type of exciter/controller, use its vendor's manual instead of the MICOM-3 publications.*

1 kW System Description

The RM1200 1 kW power amplifier, FLN3175, expands the MICOM-3 product line by offering higher transmit power (up to 1 kW, PEP and average), and thus longer reach and improved communications under bad propagation conditions and/or strong interference.

RM1200 consists of two units intended for rack mounting, together with the exciter unit: 1 kW RF linear power amplifier and AC-powered PS unit. The equipment is well suited for base station applications, and can be directly connected to a wide range of broadband or tuned antennas, including whip, dipole, traveling wave, delta, and semi-delta antennas.

Upon power-up, the RM1200 uses a low-level RF pilot signal from the exciter to automatically detect the incoming frequency and select the optimum harmonic filter band in accordance with the operating frequency. The frequency detection and filter switching is quite rapid, a capability needed for ALE and adaptive communication modes.

The RM1200 is optimized for operation in conjunction with the RM125 or RM125R radio set as exciter and controller, using a dedicated communication interface and a flexible handshaking protocol (to use these capabilities, order the special interface cable kit, option G156, for connecting the 1 kW amplifier to the RM125/RM125R). The RM125/RM125R controls the 1 kW amplifier operation, enables the operator to select the nominal transmit power, and the 1 kW amplifier provides ALC feedback to adjust the RM125/RM125R drive power to the optimum level.

Caution **Before putting a new RM1200 into operation, it is necessary to calibrate the system to obtain the correct transmit power (this calibration must also be performed after either the exciter or the RM1200 is replaced). Calibration instructions for the recommended exciter, RM125/RM125R, appear in the Publication 2072-09538-00, "Radio Service Software (RSS) User's Guide" for RSS V3.0 and higher.**

Although optimized for operation with the RM125/RM125R, RM1200 can be used with any HF-SSB driver capable of providing the required drive power (approx. 40W), and appropriate interfacing. Contact the manufacturer for details on the RM1200 interfacing requirements.

Protection circuits monitor the various operating conditions, and prevent damage to the 1 kW amplifier by taking appropriate action, in accordance with the detected problem.

The 1 kW amplifier has several status indicators, and a front-panel LCD that enables the operator to monitor the RM1200 operation. This LCD can be used to read the actual forward and reflected power (or VSWR), and report problems such as the activation of protection circuits or technical malfunctions. The LCD and the status indicators indicate the type of problem that has been detected, thus helping the operator correct it.

In addition, the 1 kW amplifier has a serial RS-232 asynchronous interface that can be used for maintenance and calibration: the program needed to use this interface is stored in the 1 kW amplifier, and therefore any data communication terminal (or PC emulation program, for example, the HyperTerminal utility available on PCs running under Microsoft Inc. Windows®) can be used.

The 1 kW amplifier is active only in the transmit mode: when not powered, in the receive mode, and also after the protection circuits are activated, the 1 kW amplifier switches to the bypass mode, and directly connects the radio set to the antenna system.

Functional Description

1 kW Amplifier

The 1 kW amplifier consists of the following main functions:

- Linear RF power amplifier covering the HF band. The RF amplifier consists of 4 independent amplification modules, whose outputs are combined to obtain the required RF output power. The RF drive signal, applied to the RF IN connector, is amplified to the appropriate level, as selected on the RM125/RM125R.
- Harmonic filter. This is a low-pass filter whose purpose is to attenuate harmonics and other undesired signals at frequencies above the actual operating frequency, before the amplified output signal is applied to the RF OUT connector. The filter has 8 sub-bands: the filter that fits the operating frequency is automatically inserted in the transmit path. The required frequency information is received from the RM125/RM125R; in addition, the 1 kW amplifier measures the actual frequency of the RF drive signal as part of its tuning process (if the frequency cannot be measured, the highest band is selected).
- Bypass circuits. These circuits automatically bypass the 1 kW amplifier and establish a direct path between the RF IN and RF OUT connectors when power is not available, or a critical malfunction is detected.
- Control circuits. These circuits control 1 kW amplifier operation, interface with the exciter/controller unit (RM125/RM125R), and take action to protect the amplifier when necessary.
- Cooling subsystem, includes internal fans that enable operation over a wide range of temperatures.

Overdrive Protection

The 1 kW amplifier requires a nominal drive power of approx. 40W. When operating the 1 kW amplifier with the RM125/RM125R as driver, the input power is automatically adjusted by an automatic level control to achieve optimal operating conditions for the amplifier.However, if the input drive power exceeds about 80W (either because incorrect setting of the operating conditions when using another's vendor's driver, incorrect connections or other possible faults), the protection circuits prevent damage to the 1 kW amplifier by bypassing it.

High VSWR Protection

To obtain maximum forward power, the RM1200 should be connected to a low VSWR antenna system. In case of excessive VSWR, for example, because of mismatch or damage to antenna system and/or feed cables, the ALC circuits prevent damage by reducing the transmit power to safe values. Thus, the RM1200 will always attempt to transmit at the maximum safe power in case of mismatch.

However, in case of excessive mismatch (for example, short or open circuit), the protection circuits switch the 1 kW amplifier to the bypass mode: in this case, the transceiver is directly connected to the antenna. This enables normal reception, as well as transmission, albeit at the lower power levels an RM125/RM125R (or the transceiver used as exciter) can provide.

1 kW Amplifier Overheating Protection

Special circuits protect the 1 kW amplifier against overheating. If the temperature is too high to enable full-power operation, the output power is automatically halved, until the temperature returns to normal. However, if the temperature exceeds the maximum allowed limit and damage may be caused, the protection circuits are activated and bypass the amplifier.

Imbalance Protection

When a fault, power failure or other type of failure prevents normal operation of one or more of its internal amplification modules, the 1 kW amplifier is automatically bypassed.

PS Unit

The PS unit is a custom design that includes 6 JWS-600-48 standard power supply modules manufactured by Lambda Inc. (see manufacturer's manual for complete information on these modules), contained in a compact chassis suitable for installation in 19" racks. The individual modules automatically share the load, without any special alignments. The assembled PS unit has been assigned a custom-design manufacturer number (YM-02-670B).

The PS unit operates on 110/220 VAC, 50/60 Hz. The AC input voltage range is automatically switched between 110 and 220 VAC, and therefore the equipment can be used in the United States of America as well as in other countries. Internal cooling fans enable operation over a wide range of temperatures.

The PS unit includes two independent power supply subsystems, each providing +45V to two of the four amplification modules in the 1 kW amplifier. Protection circuits monitor each output, and provide indications on front panel indicators in case the output voltages deviate by more than 25% from the nominal value; if an output voltage increases beyond the maximum limit, the corresponding power supply subsystem is turned off, to prevent damage to the 1 kW amplifier.

RM1200 Main Technical Characteristics

This section presents the main technical characteristics of the RM1200. if you need additional details, contact the manufacturer or your local representative.

General	*Operating Modes*	• Transmit mode (PTT controlled) • Bypass mode (input connector connected to output connector with RM1200 not powered, in the receive mode, or after protection is activated) • Tuning (automatic detection of transmit signal frequency)
	Transmit frequency range	1.6 to 30 MHz
	Maximum transmit duty cycle	Continuous transmission
	Control and maintenance interfaces	• Serial RS-232 asynchronous maintenance port for dumb terminal (control program contained in 1 kW amplifier) • Control and status port for interfacing to the RM125/RM125R as driver
	Number of system units	• 1 kW RF linear power amplifier • AC-powered PS unit, Lambda YM-02-670B
	Exciter type	• RM125/RM125R (recommended) • Any HF-SSB radio set capable of providing sufficient drive power and compatible control interface
1 kW Amplifier Electrical Characteristics	*Transmit power (PEP and average)*	User-selectable: • Max: 1000W • High: 700W • Medium: 500W • Low: 250W
	Input drive power	• 40W nominal, maximum 80W • Pilot tone for operating frequency detection: 5W nominal
	Nominal input and output impedance	50 Ω
	Intermodulation products	Less than -25 dB below each tone
	Non-harmonic products	Less than -60 dB
	Harmonics	Less than -50 dB

	Load mismatch	• Full transmit power for VSWR up to 1.3:1 • Reduced transmit power for higher VSWR • Full protection against short/open circuit
	Overheating protection	• Reduced transmit power for high temperature • Bypass in case of excessive temperature
	Operating voltage	45 to 48 VDC from PS unit
	Power requirements	• Maximum 2000W in SSB mode • Maximum 3500W in CW mode
	Cooling	Forced air cooling
Dimensions	*Height*	221 mm/8.7 inch
	Width	482 mm/19 inch
	Depth	492 mm/19.4 inch
	Weight	25 kg/55 lbs
PS Unit Main Characteristics	*Output voltage*	45 VDC nominal
	Operating voltage	110 /220 VAC, 50/60 Hz, with automatic switching
	AC power requirements	Maximum 5000W
	Cooling	Forced air cooling

Familiarization with RM1200 Equipment

1 kW PA Front Panel

Figure 1 identifies the items located on the front panel of the 1 kW amplifier, and Table 1 explains their functions.

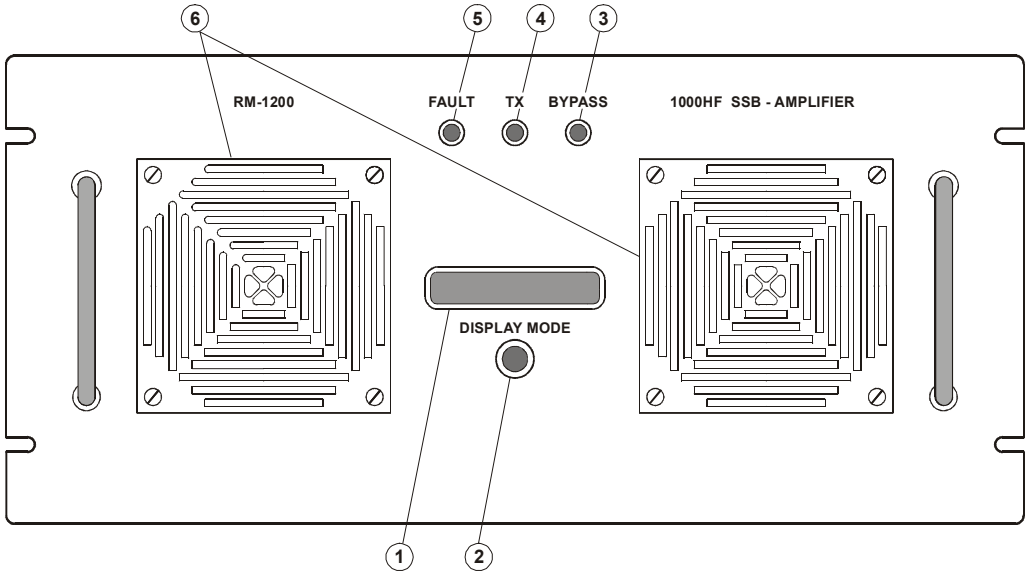


Figure 1. 1 kW PA Front Panel

Table 1. 1 kW PA Front Panel Items

Item	Description	Function
1	Display	LCD display. See the following section for displayed information
2	DISPLAY MODE push-button	Selects the type of information presented on the display
3	BYPASS indicator	Lights when the 1 kW amplifier is in the bypass mode (in this mode, the RF IN connector is directly connected to the RF OUT connector). The 1 kW amplifier is normally bypassed when the radio is in the receive mode. It is also bypassed when it is not powered, or a fault or abnormal condition prevents its normal operation
4	TX indicator	Lights when the 1 kW amplifier is switched to the transmit mode
5	FAULT indicator	Lights when a fault in the 1 kW amplifier does not allow normal operation. In this case, the amplifier remains in the bypass mode until the fault is corrected. Flashes when an operational problem, for example, high temperature or excessive VSWR, activates the corresponding protection circuits and causes the amplifier to reduce its output power or temporarily switch to the bypass mode
6	Air intake vents	Intake vents for cooling air, with removable covers that provide access to the dust filters

1 kW PA LCD Functions

The LCD is used to display information on the operational conditions of the 1 kW amplifier, and status information. The LCD comprises 2 rows, and therefore it is necessary to split the information on four different display pages of 2 rows each.

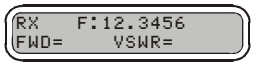
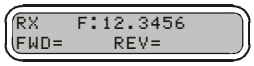
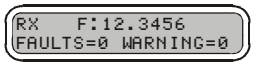
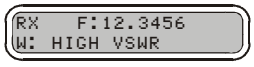
The first row of each page always presents two items:

- The current mode indicator, **RX** or **TX**
- The operating frequency, in MHz, as detected during the tuning process. The frequency is measured with a resolution of 10 kHz, and therefore, if you need to know the exact transmit frequency, always use the RM125/RM125R frequency display.

The information displayed in the second row changes with the specific page. To select a page, press the DISPLAY MODE push-button display as required (scrolling is cyclical). The selected page remains on display, until you select another page.

The information presented on each page is explained in Table 2. The pages are presented in the order they appear when scrolling by means of the DISPLAY MODE push-button.

Table 2. 1 kW PA LCD Functions

No.	Typical Page	Function
1		Normal receive screen. When transmitting (**TX**), the second row displays the forward (**FWD**) power in watts, followed by the **VSWR**.
2		Alternative screen: when transmitting, displays the forward (**FWD**) and reflected (**REV**) power in watts.
3		Status screen (shown for receive – **RX** – mode). Displays the total number of faults and warnings detected in the unit. If either number is not 0, the FAULT indicator indicates the condition with the highest severity: • If the condition with the highest severity is a warning (**FAULTS** is 0, **WARNING** is not 0), the FAULT indicator flashes • If the condition with the highest severity is a fault (**FAULTS** is not 0), the FAULT indicator lights steadily
4		Fault (**F**) or warning (**W**) screen: displays the fault and /or warning detected in the unit. See list of messages that may be displayed in Table 3

Frequency appears only after successful tuning: before tuning, and also in case the tuning fails, no frequency is displayed. For example:

The forward and reflected power (or VSWR) values are automatically updated; fault and warning information is refreshed only after scrolling again to the same page.

Note *The displayed value may fluctuate, according to the actual power measured at the instant the display has been updated. As a result, in all the transmit modes except CW (which has a constant modulation envelope), the displayed value depends on the instantaneous modulation signal, and therefore may be lower than the selected nominal transmit power.*

Protection circuits are reset after the PTT is released, but may be activated again if condition persists.

Table 3. 1 kW PA Fault and Warning Messages

Type	Message	Meaning	Corrective Actions
Fault	**AMP#1** **AMP#2** **AMP#3** **AMP#4**	The corresponding amplifier module does not operate, for example, because its supply line fuse is blown, or a fault in the module itself. 1 kW amplifier is in the bypass mode and cannot transmit	Service is required
	RF IN OVERLOAD	Excessive drive power supplied to the RF IN input. 1 kW amplifier is in the bypass mode and will not transmit until the condition is corrected	When using the amplifier with a driver other than RM125/RM125R, check the maximum transmit power of the driver unit. When using the RM125/RM125R, first check for proper connection of the control cable between the RM125/RM125R AMP-CONT connector and the 1 kW amplifier EXCITER CONTROL connector. If problem persists, service is required (adjustment of operating conditions using the MONITOR program)
	PWR OUT LATCH	Technical problem related to the harmonic filter. 1 kW amplifier is in the bypass mode and cannot transmit	Service is required
	TEMP OVERHEAT	Excessive internal temperature. 1 kW amplifier is in the bypass mode and cannot transmit until it cools	Wait for the amplifier to cool. Check that the air intake vents and exhaust vents are free. If condition recurs, power down the amplifier and clean the dust filters (the filters are reached after removing the intake covers, which are fastened by four screws each)
Warning	**PWR OUT REDUCED**	Internal temperature is too high. 1 kW amplifier transmits at reduced (half) power as long as problem persists	See **TEMP OVERHEAT**
	HIGH VSWR	Excessive reflected power. 1 kW amplifier is in the bypass mode and will not transmit until the condition is corrected	Check the antenna feed cable, starting from the RF OUT connector, and up to the antenna. Also check that no damage is evident to the cables and to the antenna itself

Table 3. 1 kW PA Fault and Warning Messages (Cont.)

Type	Message	Meaning	Corrective Actions
Warning (Cont.)	**INVALID FREQ**	1 kW amplifier could not determine the operating frequency. The frequency is measured by automatically causing the RM125/RM125R to transmit a low level (about 5W) pilot tone for a few seconds after each frequency change, and also whenever the **ENT** key of the RM125/RM125R is pressed	Check the cable connections between the RM125/RM125R and the 1 kW amplifier. Repeat the frequency measurement process by pressing the **ENT** key of the RM125/RM125R and monitor the RM125/RM125R display: it should switch to the transmit mode for a few seconds, and its transmit display should include at least two bars

1 kW PA Rear Panel

Figure 2 identifies the items located on the rear panel of the 1 kW amplifier, and Table 4 explains their functions.

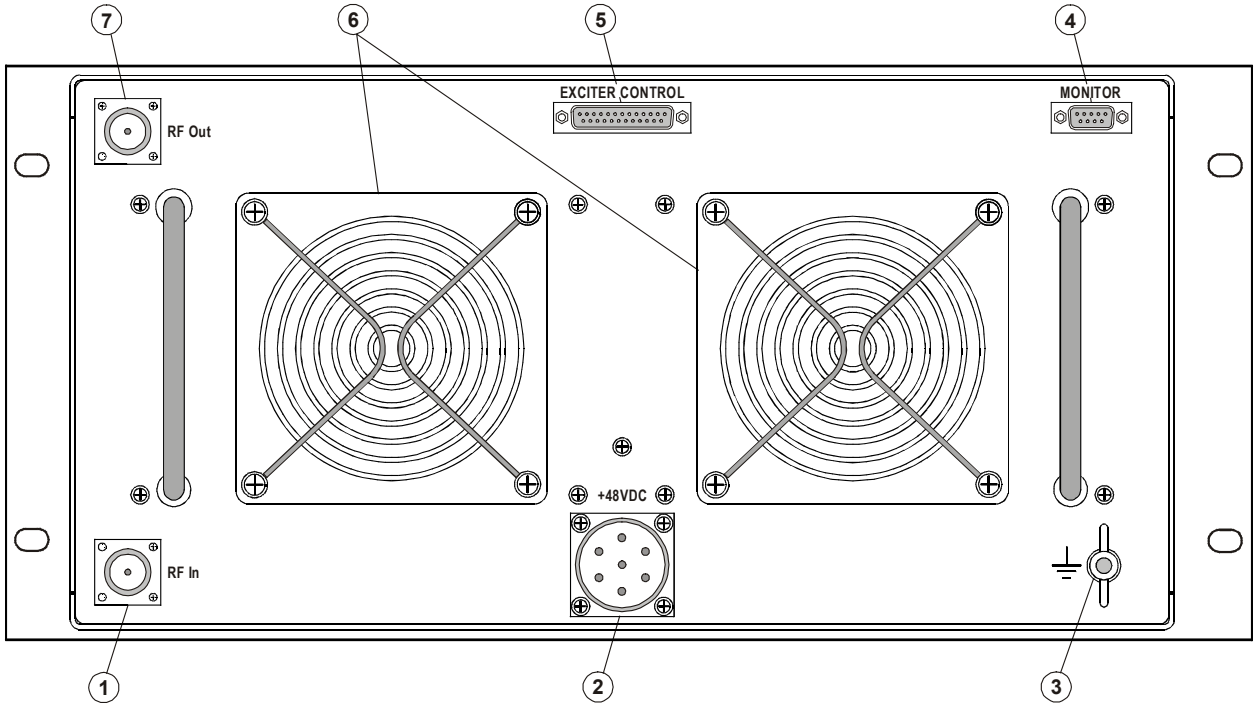


Figure 2. 1 kW PA Rear Panel

Table 4. 1 kW PA Rear Panel Items

Item	Description	Function
1	RF IN Connector	N-type connector for RF connection to the RM125/RM125R: • In the receive or bypass mode, serves as output for receive signals • In the transmit mode, serves as input for RF drive signals
2	+48VDC connector	7-pin circular connector for connection to DC power source
3	Grounding screw	Connection of ground to the 1 kW amplifier

Table 4. 1 kW PA Rear Panel Items (Cont.)

Item	Description	Function
4	MONITOR connector	9-pin D-type female connector for connection to maintenance monitor (ASCII terminal or PC with terminal emulation program)
5	EXCITER CONTROL Connector	25-pin D-type female connector, contains the control interface that enables the RM125/RM125R to control the 1 kW amplifier
6	Exhaust Vents	Cooling air exhaust vents
7	RF OUT Connector	N-type connector for RF connection to antenna system: • In the receive or bypass mode, serves as input for receive signals • In the transmit mode, serves as output for amplified RF signals

PS Front Panel

Figure 4 identifies the items located on the front panel of the PS unit, and Table 5 explains their functions.

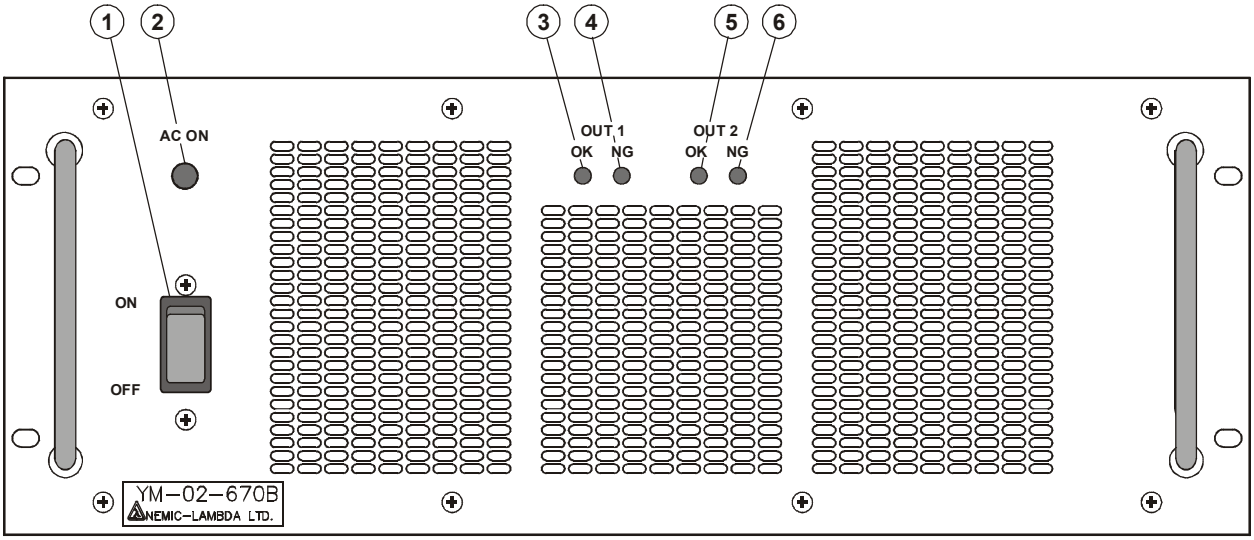


Figure 3. PS Front Panel

Table 5. PS Front Panel Items

Item	Description	Function
1	ON/OFF switch	Turns the PS on
2	AC ON indicator	Lights when the PS unit is powered
3	OUT 1 OK indicator	Lights when the power supply subsystem 1 operates normally
4	OUT 1 NG indicator	Lights when the output voltage provided by power supply subsystem 1 is not within ±25% of its normal value. To protect the 1 kW amplifier, the output voltage is automatically turned off in case it exceeds the maximum value. To attempt returning to normal operation, turn the PS off and then back on: if problem recurs, the PS unit must be serviced

Table 5. PS Front Panel Items (Cont.)

Item	Description	Function
5	OUT 2 OK indicator	Same as Item 3 for power supply subsystem 2
6	OUT 2 NG indicator	Same as Item 4 for power supply subsystem 2

PS Rear Panel

Figure 4 identifies the items located on the front panel of the PS unit, and Table 6 explains their functions.

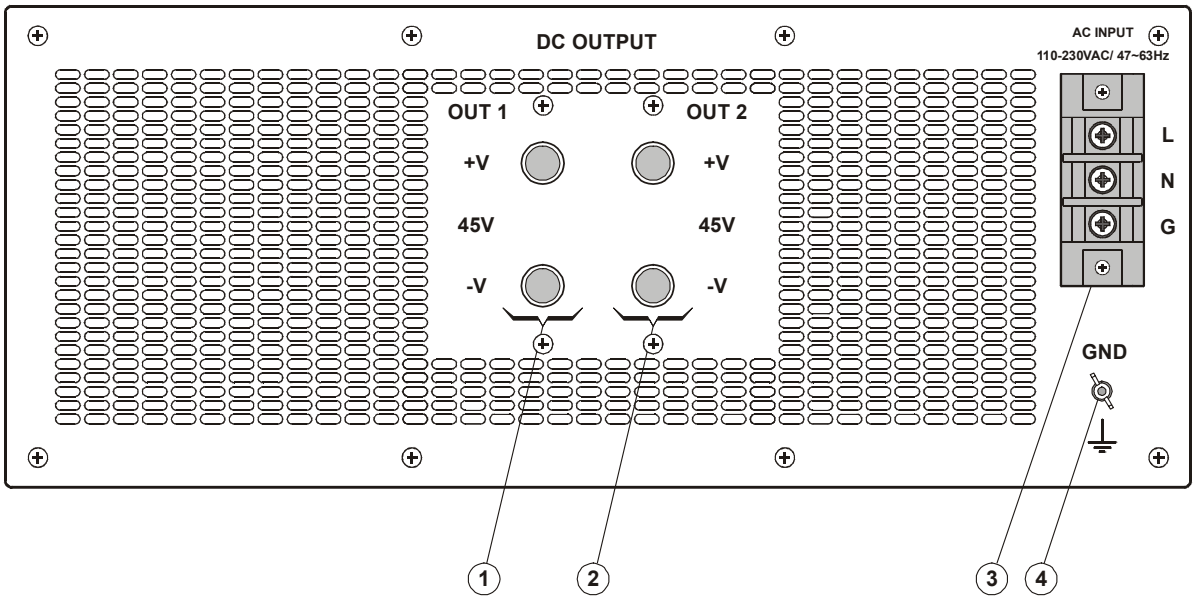


Figure 4. PS Rear Panel

Table 6. PS Rear Panel Items

Item	Description	Function
1	OUT 1 +V, -V terminals	Output voltage terminals of power supply subsystem 1
2	OUT 2 +V, -V terminals	Output voltage terminals of power supply subsystem 2
3	AC INPUT strip	Terminal strip, covered by a protective cover, for connection to AC power source: • **L** – line (phase) terminal • **N** – neutral terminal • **G** – ground terminal
4	Grounding screw	Connection of ground to the 1 kW amplifier

RM1200 Equipment Installation

Safety

Warning

For general operating and installation safety information, see the "Owner's Guide, MICOM-3F/3T/3R HF-SSB Transceivers", Publication 6886867J01.

During installation work, strictly observe the applicable safety precautions and local regulations. Do not work on the antenna system during lightning storms.

Warning

Proper grounding is essential for your safety, and for good communication performance.

Do not touch the antenna and the RF connectors while the RM1200 and/or the exciter (RM125/RM125R or equivalent) operates. During transmission, high RF voltages appear at the RF connectors, the antenna cables, and on the antenna itself. These voltages may cause severe injury or death on contact.

Make sure the antenna is not located near high-voltage lines.

All personnel must be familiar with the applicable safety requirements before attempting to install or operate the RM1200 and/or the exciter (RM125/RM125R or equivalent). Severe injury or death could result from failure to comply with the safety practices.

Warning

High AC voltage, capable of causing death or injury on contact, is present on the AC INPUT terminal strip at the rear panel of the PS unit when the unit is connected to a power source.

Caution

The RM1200 units are a two-person lift. Make sure that help is available during the installation activities.

Caution

Before putting a new RM1200 into operation, it is necessary to calibrate the system to obtain the correct transmit power (this calibration must also be performed after either the exciter or the RM1200 is replaced). Calibration instructions for the recommended exciter, RM125/RM125R, appear in the Publication 2072-09538-00, "Radio Service Software (RSS) User's Guide" for RSS V3.0 and higher.

Installation Planning Guidelines

This section provides the additional information necessary for planning the installation of the RM1200 option. For information regarding the exciter/controller unit, refer to its manual.

Grounding

Failure to provide proper grounding to each system unit (RM125/RM125R, 1 kW PA and PS unit, and to the optional PPS) and to the rack in which these units are installed will degrade system operation and cause RF voltage to be present on the equipment chassis. A possible serious hazard to personnel could result, as well as equipment malfunction.

Wide copper straps, as short as possible, must be used for grounding. These straps must be clamped or bonded to a common grounding point within the rack, which is connected to a reliable, low-resistance grounding system.

Power Requirements

The RM1200 PS unit requires AC power at a nominal voltage of 110 or 220 VAC, 50/60 Hz. The PS unit will automatically select the appropriate voltage range.

The maximum AC power consumption during high-power transmission is up to 5 kW.

In addition to the circuit breaker or fuse protecting the supply line to the RM125/RM125R, a suitably rated circuit breaker or fuse must be used to protect the supply line of the PS unit, and enable disconnection of its supply voltage during installation and maintenance.

Cooling

RM1200 units, as well as the RM125/RM125R, are cooled by internal fans. Air is taken in through the front panel vents, and discharged toward the rear. Therefore, make sure that sufficient free space is available around the equipment to enable free air flow.

Do not stack equipment units: leave at least 1U free above and below each unit installed in the rack.

Installation Data

The RM125/RM125R, the optional Pre-Selector/Post-Selector (PPS) and the RM1200 units (1 kW PA and PS) are intended for installation in one customer-provided 19″ rack. The interface cable kit for MICOM RM1200 1 kW linear amplifier, option G156, is also intended for installation in the same rack.

Each equipment unit has front-mounted brackets for attachment. To provide convenient access during maintenance, each equipment unit may be installed in a sliding drawer or on slides capable of supporting the equipment weight.

The rack itself must be securely fastened to the floor, before starting the installation activities.

Sufficient front and rear clearance is required to permit convenient access to front and rear panels, as well as for removal and installation of equipment units, connection of cables, and maintenance.

Antenna System

Antenna systems are selected in accordance with the specific communication requirements of each customer: many HF antenna types are available, each providing different radiation characteristics to meet different communication requirements. Therefore, the selection and installation of an antenna system is customer's responsibility. If necessary, contact the manufacturer or your local representative for additional information.

The antenna system must provide a matched termination at the operating frequency, and must be capable of handling the maximum power output of the RM1200.

Antenna Feed System

The antenna feed system comprises any cables, panels and matrices, and any accessories that carry HF signals between the RM1200 and the antenna itself.

The high output power of the RM1200 requires particular attention to the power rating of the antenna system, and to the use of a high-quality, low-loss feed cable. Appropriate safety measures must be taken to prevent people from touching the antenna, or even getting close to it.

All the antenna feed system components, and in particular the feed cable, must have low loss and be capable of carrying the maximum power output of the RM1200. Remember that any power loss along the cable is signal loss!

To protect yourself and the radio equipment against lightning strokes and accidental contact of antenna and/or feed cable with high voltage lines, a properly grounded coaxial protector must be installed at the point of entry of the feed cable into the building or communication shelter. The recommended protector type is IS-B50LN-C0 by PolyPhaser Corp. (also available from the manufacturer as Cat. No. 2072-09128-00).

Preparations for Installation

Before starting the installation of an RM1200, review the installation plan and make the following checks:

1. Identify the rack or cabinet in which the equipment will be installed, and check that the rack is securely fastened to the floor.
2. Check the mounting surfaces, and the rack mounting holes. Thoroughly clean the mounting surface and remove all paint, grease and dirt from the holes to provide a better grounding connection.
3. Check availability of AC power, and grounding arrangements.
4. Check antenna installation, in accordance with the antenna installation and operation manual.
5. Check the cable runs between the RM1200 and the prescribed antenna, including the coaxial protector. Make sure that the cables are securely fastened, and do not show signs of external damage.
6. Make sure that you have the cable sets needed for the installation, which includes the RM1200 cable set, and cables for connecting to the exciter unit (for example, use the cables in option G156 for connecting to the RM125/RM125R).

Caution

Before installing equipment units on slides, make sure you are familiar with the procedures needed to install slides in the rack/cabinet, and to safely install heavy equipment on the slides.

Installation Procedure

Note

All the information appearing in this section is presented for RM1200 used with the RM125/RM125R as exciter.

For RM125/RM125R installation and operation instructions, refer to the "RM125/RM125R Owner's Guide", Publication 6888882V02.

If you are using another vendor's equipment, refer to its installation and operation manual.

Refer to Figure 5 for a typical RM1200 interconnection diagram (this figure shows a system using the RM125/RM125R as exciter).

1. Identify the installation position of each equipment unit in the rack.
2. Install each equipment unit in the prescribed installation position, fastening it by means of screws to the rack rails or to the drawer front.
3. Connect grounding straps from each grounding screw (located on the rear panels of the various units), to the prescribed cabinet's grounding bar.
4. Set all the power switches on all the equipment front panels to OFF (down position).

Caution

The 1 kW PA unit does not have a power switch, and therefore it will start operating as soon as the RM125/RM125R is turned on, provided that the PS unit is already turned on.

5. Connect cables to the RM125/RM125R unit as explained in its Owner's Guide, including the relevant DC power connections. The only difference is that the RM125/RM125R RF OUT connector must be connected to the RF IN connector of the 1 kW amplifier.
6. Connect the control cable between the RM125/RM125R AMP-CONT connector and the 1 kW amplifier EXCITER CONTROL connector.
7. Connect the antenna feed cable to the RF OUT connector of the 1 kW amplifier.
8. Connect the DC power cable between the 1 kW amplifier +48VDC connector and the four DC OUTPUT terminals of the PS unit. Pay attention to correct connection of the two pairs of leads to the DC OUTPUT terminals, with respect to polarity and OUT pair.
9. Connect the three leads of the PS unit AC power cable to the AC INPUT terminal strip, in accordance with the functions of each lead. After making the connections, make sure that the protective cover of the terminal strip is properly installed.
10. Connect the other end of the AC power cable of the PS unit to the prescribed outlet on the power distribution box of the cabinet.

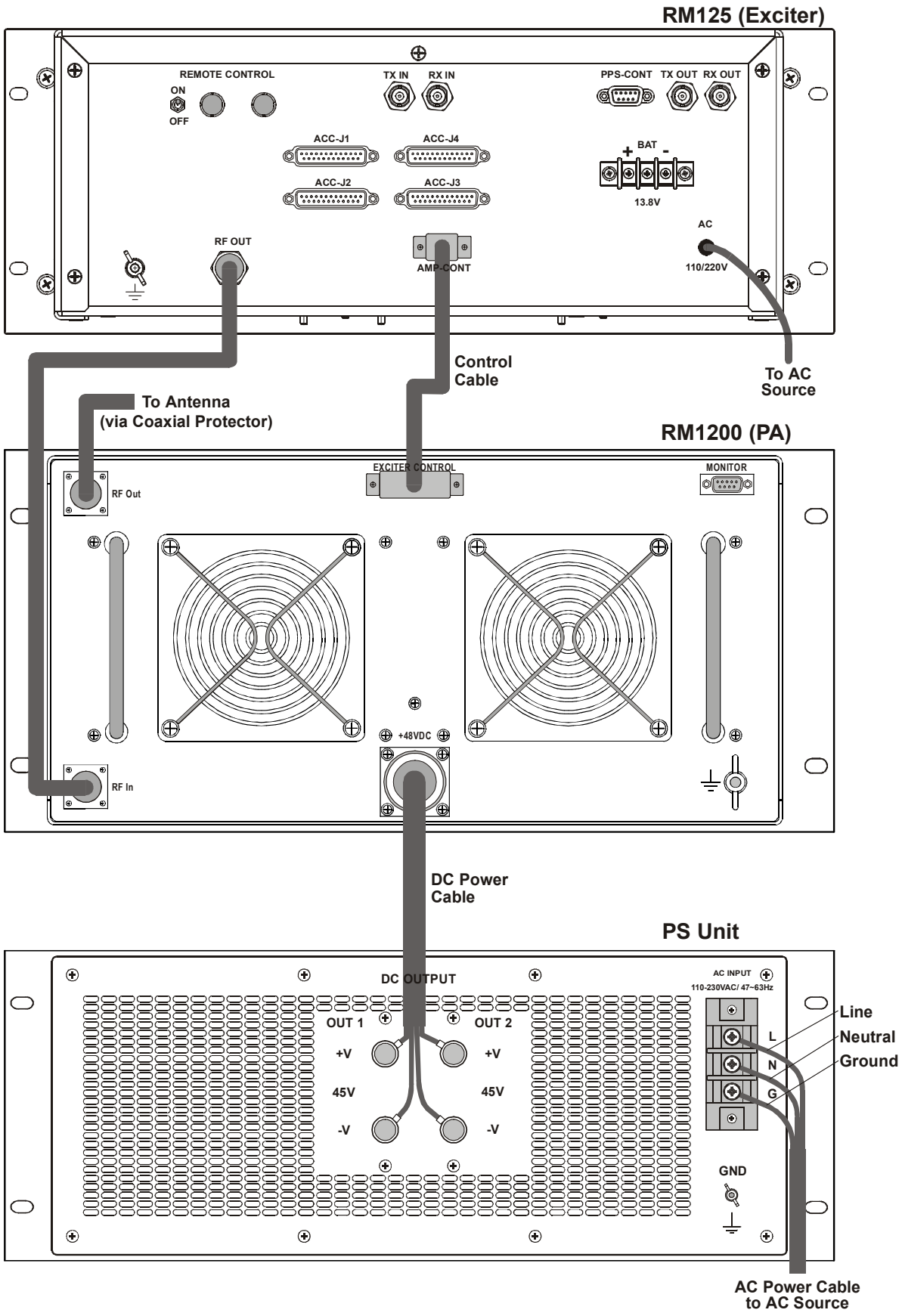


Figure 5. Typical RM1200 System Connections

RM1200 Operation

General

The following instructions present operating procedures specific to the RM1200 also used with the RM125 or RM125R as exciter. It is assumed that the operator is familiar with the RM125/RM125R operating procedures, as described in the Publication 6888882V02, "RM125/RM125R Owner's Guide", Publication 6886867J01, "Owner's Guide, MICOM-3F/3T/3R HF-SSB Transceivers", and the applicable MICOM-3 Supplements that cover optional features.

Preparations for Operation

1. Set the REMOTE CONTROL switch on the rear panel of the RM125/RM125R to the OFF (down) position.
2. For the RM125R, set the internal speaker switch to ON (up).

Calibration Procedure

After installing a new 1 kW amplifier, it is necessary to calibrate the automatic transmit power level loop, which adjust the exciter transmit level to match the 1 kW amplifier requirements.

Calibration instructions for a 1 kW amplifier used in conjunction with the RM125/RM125R are given in Publication 2072-09538-00, "Radio Service Software (RSS) V3.0, User's Guide" (see para 12.2: "Power Calibration" in Chapter 12: Technician Mode).

The calibration procedure is performed for each transmit level:

- **LOW**: nominal transmit power of 250W.
- **MED**: nominal transmit power of 500W.
- **HIGH**: nominal transmit power of 700W.
- **MAX**: nominal transmit power of 1000W.

Exceeding the maximum rated power of the 1 kW (1000W) amplifier may damage the equipment, and therefore it is highly recommended to adjust the MAX transmit power to 900W (that is, 0.5 dB below the rated maximum).

This is a precaution that takes into consideration the accuracy of the equipment used to measure the output power.

Note *If no equipment capable of measuring the 1 kW amplifier transmit power is available, it is possible to use the 1 kW amplifier own display to determine the transmit power.*

Do not use this method, unless it is absolutely impossible to obtain appropriate test equipment.

Equipment Turn-On

1. Apply power to the RM125/RM125R by setting its AC power switch to ON (up).
2. Set the AC power switch on the PS unit to ON, and monitor its indications. The expected indications, as well as what to do if a problem is detected, are described in Table 7.
3. Turn the RM125/RM125R ON/OFF switch and volume control clockwise and adjust for a comfortable listening level.
4. The 1 kW amplifier is also turned on. Monitor its power-up indications. The expected indications, as well as what to do if a problem is detected, are described in Table 7.
5. If necessary, select the prescribed channel and operating mode of the RM125/RM125R. Make sure that the RM125/RM125R is programmed to use the 1 kW amplifier (you should see **AMP** on the ***PROG>RAD>OPTS>ACC*** menu).

Table 7. RM1200 Power-up Indications

Unit	Expected Indication	What to do if not …
PS Unit	AC ON indicator lights	Check that AC power is available, and that the PS unit is properly connected to the AC distribution panel
	OUT 1 and OUT 2 indicators light. NG 1 and NG2 indicators off	The PS unit requires service. Turn the PS unit off: do not attempt to continue using the 1 kW amplifier until the problem is corrected. You can still transmit and receive using the RM125/RM125R (maximum transmit power – 125W) by selecting **NONE** on the ***PROG>RAD>OPTS>ACC*** menu.
1 kW PA	All the front panel indicators flash together a few times as the unit performs its power-up initialization sequence, and then turn off	If the FAULT indicator lights, a fault has been detected in the 1 kW amplifier (you may read the problem by means of its from panel LCD). Service the 1 kW amplifier. However, you can still transmit and receive using the RM125/RM125R by selecting **NONE** on the ***PROG>RAD>OPTS>ACC*** menu. If the BYPASS indicator lights while in the transmit mode, make sure to select **AMP** on the RM125/RM125R ***PROG>RAD>OPTS>ACC*** menu.
	The 1 kW amplifier tunes to the RM125/RM125R operating frequency. After successful tuning, its front panel LCD displays the selected frequency	Check for proper connection of the RF and control cables between the RM125/RM125R (or other exciter unit you are using), and the 1 kW amplifier. If tuning fails even after turning the equipment off and on again in the proper turn-on sequence described above, you are still able to transmit and receive using the RM125/RM125R by permanently bypassing the 1 kW amplifier. For the RM125/RM125R, you bypass the 1 kW amplifier by selecting **NONE** on the ***PROG>RAD>OPTS>ACC*** menu

Operating Instructions

You are now ready to start using the radio set. For the additional operating procedures, you may use the information appearing in the "RM125/RM125R Owner's Guide", Publication 6888882V02, and in the "Owner's Guide, MICOM-3F/3T/3R HF-SSB Transceivers", Publication 6886867J01.

1. During reception, you will see the receive indications (**RX** and the operating frequency) on the 1 kW amplifier LCD.

   Note *The tune indications described in Table 7 will appear whenever you change the operating frequency, and also whenever the **ENT** key of the RM125/RM125R is pressed. If the frequency cannot be identified, you will see an **INVALID FREQ** message, and it is not possible to transmit using the 1 kW amplifier (the 1 kW amplifier is bypassed).*

2. When you press the PTT to start a transmission, the TX indicator of the 1 kW amplifier lights, and you will see the transmit indications (**TX** and the operating frequency) on its LCD.

   The second row of the LCD displays the transmit power, and the VSWR.

   Note *During normal transmission, the TX indicator lights, and the BYPASS and FAULT indicators are off.*

   If the BYPASS and FAULT indicators light, the 1 kW amplifier switched to the bypass mode because it either overheated to dangerous levels, or the antenna VSWR is too high, or because it could not identify the operating frequency. You can read the information displayed by the LCD to get additional details (see Table 3). In this case:

   1. *If the operating frequency has not been identified, repeat the frequency measurement process by pressing the **ENT** key of the RM125/RM125R and monitor the RM125/RM125R display: it should switch to the transmit mode for a few seconds, and its transmit display should include at least two bars.*
   2. *Check that the amplifier cooling fans operate normally, and that nothing blocks the air intake and exhaust vents.*
   3. *Check the antenna system and the feed cable for accidental disconnection or damage.*
   4. *If problem persists after turning the equipment off and then on again in the proper sequence, service is needed.*

   If the FAULT indicator flashes but the BYPASS indicator is off, the 1 kW amplifier halved its transmit power because it overheated. In this case, take the steps described in Item 2 above.

Equipment Turn-Off

1. Turn the RM125/RM125R off: turn the front panel ON/OFF switch and volume control fully counterclockwise, beyond the detent position. Now set its AC power switch to OFF.

   Note *At this stage, the 1 kW amplifier is also turned off.*

2. Turn the PS unit off by setting its ON/OFF switch to OFF.