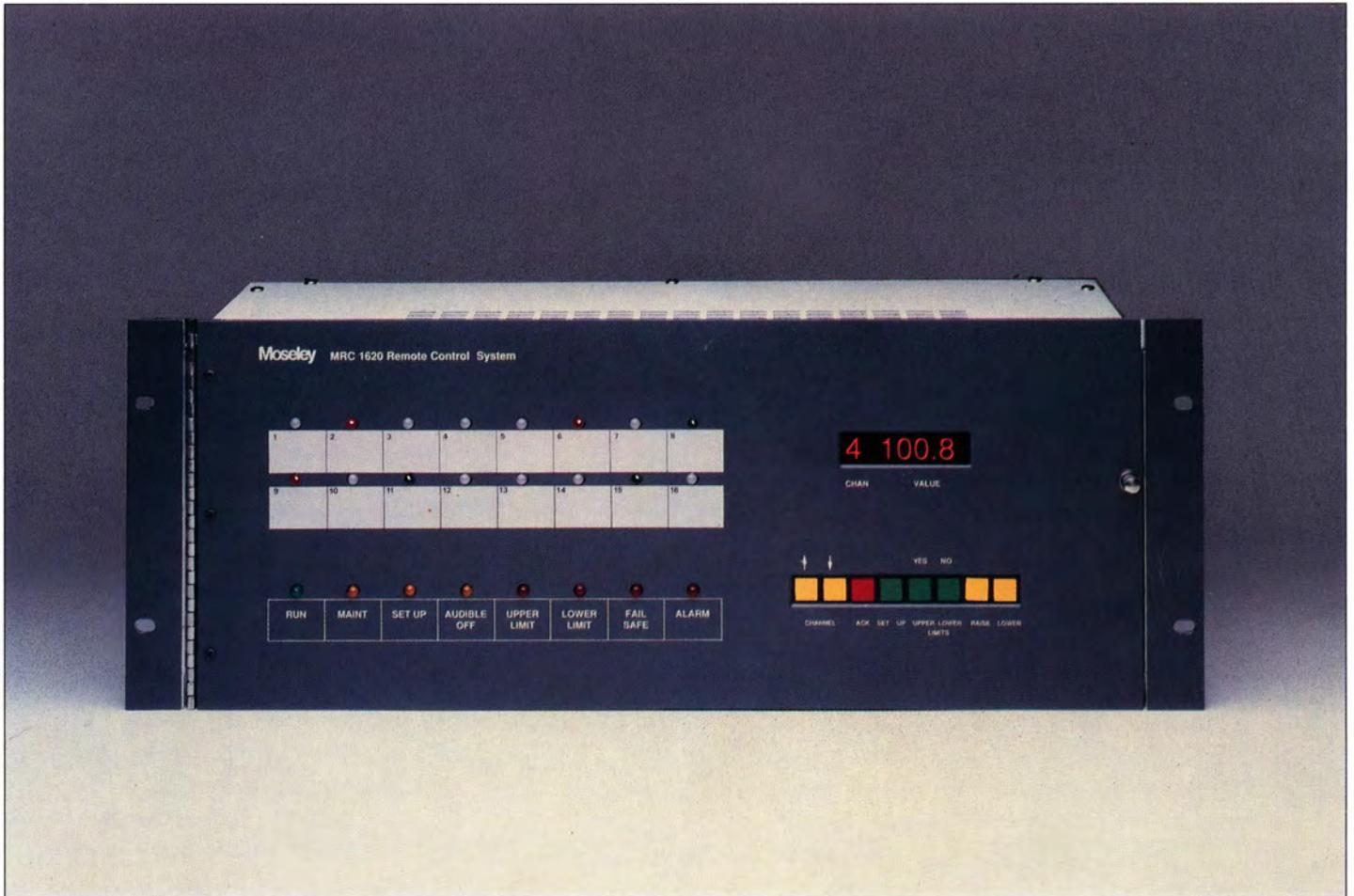


Moseley



MRC 1620 Microprocessor Remote Control

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MRC 1620 SCADA System

The MRC 1620 Remote Control is an intelligent, integrated Supervisory Control and Data Acquisition (SCADA) system that offers flexibility and sophistication in an economical and dependable package for general remote control applications in the energy, utility, transportation and telecommunication industries.

Configuration

The MRC 1620 system consists of a Remote Terminal that allows an optional Control Terminal or IBM PC with TaskMaster20 software to monitor and control a remote facility from both dedicated and/or dial-up control points. The MRC 1620 Remote Terminal comes equipped with 32 relay isolated command outputs (16 raise/16 lower), 16 TTL status inputs and 16 analog metering inputs with the required terminal connectors.

Accessible

In broadcast applications, the system may be configured as a standard Remote Control with a Control Terminal at the studio and the Remote Terminal at the transmitter. The Remote Terminal may also be interrogated over dial-up lines using the TaskMaster20 software and modems. The TaskMaster20 can also be used to directly connect a PC at the Control or Remote Terminal for automatic logging and automatic controls.

Intelligence

Telemetry limit checking and status alarm capability ensure that an unmanned facility operates at peak efficiency. During alarm conditions, intelligent, automatic corrective action can be taken by the Remote Terminal under the direction of the TaskMaster20.

Communication

The Remote Terminal comes equipped with a built-in internal 1200 baud modem to communicate over dedicated circuits (STL/TSL/FMSCA or 2/4 wire leased lines). An external 1200/2400 baud auto-answer modem for dial-up access over the public switched telephone network is also included with the Remote Terminal. This modem can be moved to the Control Terminal should dial-up access be available only at that location.

Set Up

System set up and calibration are done at the Remote Terminal with eight color coded buttons. For each channel, upper and lower telemetry limits may be set or disabled independently and may be calibrated in either power, indirect power, linear or microvolt mode. Status inputs may be set to display direct or inverted and may be programmed to trigger an alarm on rising, falling, or rising and falling waveforms.

Non-volatile memory is standard in the MRC 1620. In the event of a power-down, all set-up data, calibration and limits are stored in an EEPROM for up to ten years.

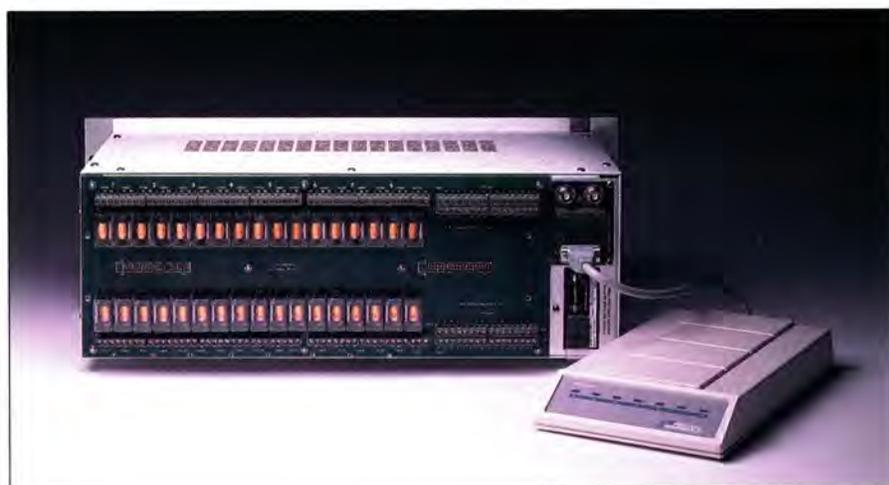
Operation

The MRC 1620 Remote and Control Terminals are simple to operate and easy to understand. All status channels are simultaneously displayed on a set of 16 LEDs. The front panel displays read-outs of selected channel number and telemetry data. LEDs indicate operation mode, alarms and other system parameters.

The MRC 1620 constantly checks telemetry and status data for each channel against assigned limits. Out of parameter conditions immediately trigger an audible and visible alarm. The front panel allows the operator to issue commands to either raise or lower the telemetry values to bring that channel back within limits. The telemetry and status channels also have an optional muting feature.

System Diagnostics

The MRC 1620 maintains two special system test channels. One checks A/D conversions and provides an alarm when tolerance exceeds factory-set limits. The second gives the user read-outs of data link quality.



TaskMaster20 Software



◀ The TaskMaster20 software is an easy to use software package that allows you to access and control your Remote Terminal via a PC and modem. Pull down menus are available on each screen to assist you with operation of the TaskMaster20.



◀ The system automatically boots to the Monitor Screen for the site I.D. that you choose. The Monitor Screen allows you to view the parameters for all 16 status and telemetry channels. Use this screen to issue raise and lower commands.



◀ Current alarm conditions are displayed and acknowledged on the Alarm Page. Up to 20 of the latest alarms and hourly log data from the last 30 hours can be logged at your convenience.



◀ A three-tiered password ("Monitor", "Control" and "Master") environment protects your system. Only the "Master" password may change set-up information. Program the Site Name and password on the first Set-up Screen. Nine (9) auto-dial numbers are also programmable to directly call out to a TaskMaster20 when alarm conditions occur.



◀ You customize your own channel and status labels on the second Set-up Screen. Remote setup attributes may be uploaded or downloaded from the MRC 1620. Once you have entered your site labels, status labels and password information, you can access any site by simply entering the site I.D. with the proper password.



◀ Program auto-control information in the Auto Screen. Commands can be set up to be issued when a telemetry value exceeds its limits. Commands can also be initiated from a change of status condition.



Specifications

General

Type of system: Microprocessor-based Control and Remote Terminals.

Failsafe:

- Complies with current FCC requirements.
- Responds after failure of interconnecting circuit. User programmable from 1 to 9999 minutes (0 to 166 hours). Can be disabled.

Failsafe Output: RT SPDT relay contacts (Form C), 2A, 30 Vdc, non-inductive.

Alarm Indications: Visual and aural (both RT and CT). Aural alarm defeatable and remoteable.

Maintenance Override: RT only front panel control provides RT relay closure. SPDT relay contacts (Form C), 2A, 30 Vdc, non-inductive.

Interconnects

Classes: 2/4 leased line, FM subcarrier or combination.

2/4 wire:

- 600 ohm balanced line, nominal. Send level: 0 dBm, nominal.
- Receive level: -30 dBm minimum.
- Requires voice grade Series 422 (2-wire) or Series 420 (4-wire) [basic conditioning] data channel. [Formerly Series 3002—Bell System Technical Reference PUB-41004.]

Subcarrier (Optional):

- 2200 ohm nominal unbalanced line, in & out. Send level: 1.5V p-p, nominal.
- Receive level: 0.25 V p-p, minimum. Frequency modulation of subcarrier on a specific frequency between 26 kHz and 185 kHz.

Modulation: Two tone FSK. 1200/2200 Hz.

Data Rate: 1200 bits/s. Half duplex.

Serial Interface: RS-232 for direct or "AT" modem connection to PC. 2400 or 1200 or 300 bits/s.

Data Format (all): 8-bits, no parity, 1 stop bit.

Command Functions

Number of Outputs: 16 raise and 16 lower.

Inputs: Front panel raise/lower buttons.

Outputs: SPDT (Form C) relay contacts, 2A, 30Vdc, non-inductive.

Response Time: 500 ms, typical.

Status Functions

Number of Inputs: 16 inputs

Inputs: TTL-compatible closures at the Remote Terminal. (3300 ohm internal pull-up resistors).

Input Filtering: L-C low-pass filter for each input.

Input States: User programmable for N.O. or N.C. contacts.

Indication: Front panel green LEDs at RT and CT. Changeable to red.

Response Time: 1s, typical, from status change to indication at the CT. 250 ms, typical, when commands are being issued from the CT.

Telemetry (Analog) Functions

Number of Channels: 16 inputs

Inputs: Analog ± 4.5 Vdc maximum, single ended referenced to ground. Other inputs optional.

Input Impedance: 500 kOhm, nominal.

Input Filtering: L-C low pass filter for each channel.

Calibration: Via front panel buttons in millivolt, linear, power or indirect power mode. A minimum of 0.25 volts required for full-scale calibration (9999) to maintain stated accuracy.

A/D: One part in 4096 (12 bits + sign)

Measurement Accuracy: Better than 0.5%

Sample Rate: Greater than 9 times/second on displayed channel.

Response Time: 1s, typical, from an input change at the RT to indication at the CT. 250ms, typical, when commands are being issued from the CT.

Physical

Power (CT or RT): 100/120/220/330/240 Vac, 50/60 Hz, 30 W, typical.

Operating Temperature: 0-50C

Size (WxHxD): 49 cm x 18cm x 23cm (29" x 7" x 9")

Options

TaskMaster20: Single-site MRC. 1620 PC. Software requires IBM PC/XT equivalent or better.

MasterController: Multi-site MRC 1620/MRC 2 PC Software requires IBM PC/AT equivalent or better

Subcarrier Communications: Available on standard frequencies from 26 to 185 kHz

TaskMaster 20 Hardware Requirements

Minimum	Upgrade
Computer	
• IBM PC/XT or PS/2	• 286/386-based compatible
• 320KB RAM	• 640KB RAM or more
• Serial Port	
• Parallel Printer Port	
• 360KB Floppy Disk Drive	• 1.2MB or 720KB or 1.44MB
• 20MB Hard Disk	• 40MB Hard Disk or more
• Color Graphics Adapter	• EGA or VGA capability
Monitor	
• CGA Monitor	• Multi-sync Monitor
Modem	
• 1200 baud	• 2400 baud
• Hayes "AT" compatible	
• Internal or external	
Printer	
• IBM compatible parallel printer	
Cables	
• Parallel printer cable	
• Modem cable if using external modem	
• Null-modem cable if using direct connect	
DOS	
• Version 3.0 or later	

Software Features

- Dial or direct connect to an MRC 1620 Remote or Control Terminal.
- Display current analog and status values.
- Display and acknowledge alarms.
- Manually control an MRC 1620 Remote Terminal (RT).
- Automatically control (via analog limits and status conditions) an RT.
- Display, edit, and store PC screen labels.
- Download and store the set-up parameters from the MRC 1620.
- Recall and upload the set-up parameters to the MRC 1620.
- Maintain and generate log file(s) from up to 16 RT sites at user-specified intervals during the day.
- Generate a printed log.



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GLOSSARY

A/D	Analog to digital
CPU	Central processing unit
CT	MRC1620 Control Terminal
DOS	(PC- or MS-) Disk Operating System
LED	Light-emitting diode
Modem	MOdulator/DEModulator
NC	Normally closed (contact)
NO	Normally open (contact)
PC	Personal Computer
PSTN	Public Switched Telephone Network
RT	MRC1620 Remote Terminal
SCA	Subsidiary Communications Authority
Status	On/Off (Go/No-Go) input to the Remote Terminal representing an occurrence of interest, such as doors opening, transmitter overloads, fire, etc.
TELCO	Telephone Company
Telemetry	Varying analog voltage input representing a metering function not normally input directly, i.e. 3.0 Vdc may represent a plate voltage of 7500 volts in a transmitter.

1. SYSTEM CHARACTERISTICS

1.1 Introduction

The TaskMaster20 Remote Access Program allows you to monitor and control your MRC1620 from a personal computer (PC). These capabilities are provided:

- * Dial or direct connect to an MRC1620 Remote or Control Terminal.
- * Display current analog and status values.
- * Display and acknowledge alarms.
- * Manually control an MRC1620 Remote Terminal (RT).
- * Automatically control (via analog limits and status conditions) an RT.
- * Display, edit, and store PC screen labels.
- * Download and store the set-up parameters from the MRC1620.
- * Recall and upload the set-up parameters to the MRC1620.
- * Maintain and generate log file(s) from up to 16 RT sites at user-specified intervals during the day.
- * Generate a printed log.

The TaskMaster20 allows a variety of configurations to be used:

1. RT and Personal Computer (PC) as the Control Terminal.
2. RT and CT with a PC connected to the RT.
3. RT and CT with a PC connected to the CT.
4. RT and CT with PCs connected to both the CT and RT
5. RT connected to two PCs.

The PC may be connected directly (with leased lines, subcarriers, or RS-232) or via the Public Switched Telephone Network (PSTN/Dialup) at either the RT or CT. This manual discusses the TaskMaster20 installation and operation. Operation of the MRC1620 RT and CT is described in a separate manual.

1.2 Recommended Hardware

We recommend the following minimum system (although you may wish to upgrade some or all of these items):

Computer

<u>Minimum</u>	<u>Upgrade</u>
* IBM PC/XT or PS/2 Compatible Compatible	286- or 386-based
* 256KB RAM	640KB or more
* Serial Port	
* Parallel Printer Port	
* 360KB Floppy Disk Drive	1.2MB or 720KB or 1.44 MB
* 20MB Hard Disk	40MB or more
* Color Graphics Adapter	EGA or VGA capability

Monitor

* CGA Monitor	Multi-sync Monitor
---------------	--------------------

Modem

* Hayes "AT" Compatible 1200 baud internal or external	2400 baud
--	-----------

Printer

* IBM Compatible parallel printer	
-----------------------------------	--

Cables

- * Parallel Printer Cable
- * Modem Cable if using external modem
- * Null-Modem Cable if using direct connect

DOS

- * Version 2.1 or later

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2. INSTALLATION

The following instructions apply to the great majority of installations. Please try these first. Don't despair if yours is slightly different. Moseley Technical Services Personnel can be of assistance.

In these discussions, DOS commands are in *italics*: *DOS_COMMAND* [*optional entries*]. <Enter> means press the Enter key on the keyboard. Be sure to put in spaces where shown. Be sure not to put in spaces where not shown. Note that the slash (/) and backslash (\) character have different meanings in DOS. Be sure to use the correct one.

2.1 Floppy Disk Backup

We strongly recommend that you make a backup copy of your TaskMaster20 original floppy disk. You can do this by using the DOS DISKCOPY command. For example

```
DISKCOPY A: A: <Enter>
```

Then put your original disk in a secure place for safekeeping.

2.2 Hard Disk Installation

To install TaskMaster20 onto your hard disk, insert your TaskMaster20 disk into drive A and perform the following DOS commands:

```
C: <Enter>  
MD \TM20 <Enter>  
CD \TM20 <Enter>  
COPY A:\*. * <Enter>
```

To make your computer start the TaskMaster20 program automatically upon power up, add the following lines to the end of your AUTOEXEC.BAT file in the root directory (using EDLIN, TED or other text editor):

```
C:  
CD \TM20  
TM20 <SiteName> [options]
```

Please see Section 3.1 for a list of the options which can appear after TM20 on the command line.

2.3 Modem Connections

Internal "AT" Modem

Be sure your Internal Modem is set up not to conflict with any Serial Port already installed in your PC. You might want to set the Modem to COM2 to avoid conflicts. TaskMaster20 can handle this configuration.

Connect a modular telephone cord from the LINE or WALL jack on the modem to the TELCO-provided RJ-11 jack.

External "AT" Modem for the PC

Connect a "Modem" cable from the modem to your PC. If your PC has a 25-pin connector for the COM port, you can use a "straight-thru" cable. If your PC has a 9-pin connector for the COM port, you will need a 9-pin to 25-pin adaptor. These cables are readily available from Moseley or your local computer store. If you want to make your own cables, Schematics can be found in Section 6.

Connect a modular telephone cord from the LINE or WALL jack on the modem to the TELCO-provided RJ-11 jack.

External "AT" Modem for the MRC1620

Connect a 9F-25M Modem Cable from the modem to the MRC1620. (See section 5 for Schematics.)

Connect a modular telephone cord from the LINE or WALL jack on the modem to the TELCO-provided RJ-11 jack.

Direct Connection

Connect a "null-modem" cable from your PC to the MRC1620. If your PC has a 25-pin connector for the COM port, you will need to use a 9F-25F Null Modem Cable. If your PC has a 9-pin connector for the COM port, you will need to use a 9F-9F Null Modem Cable. (See Section 6 for Schematics.)

2.4 Modem Settings

Modems are by no means standardized. Each manufacturer has a slightly different idea of perfection, so all modems are not created equal. We have found that the following settings work for the majority of installations:

For modems with DIP switches the settings are (for modem connected to the PC and the modem connected to the MRC1620) as follows:

<u>DIP SW</u>	<u>Position</u>	<u>Function as switched</u>
1	UP	Supports RS-232C DTR lead
2	DOWN	Digit result codes
3	DOWN	Result codes displayed
4	DOWN	No echo unless half-duplex and on-line
5	DOWN	Auto-answer disabled
6	UP	Carrier detect enabled
7	UP	Single-line telephone w/ RJ11 Jack
8	DOWN	Enables 1200 baud command responses
9	UP	Bell 103/212A
10	UP	Modem hangs up to command state when DTR goes low

Note that the above settings are for Hayes SmartModem1200 modems. Not all modems have the same DIP switch functions for every switch, so be sure to consult the manual that came with your modem for proper settings.

For modems without DIP switches, send the following string to the modem. (You can do this with a communications program such as ProComm or CrossTalk or with the TaskMaster20 "Direct Serial Link" option on the System Menu--See Section 3.4):

AT&C1&D2&L0B1E0L1M1Q0S0=0V0X4&W

Note that the above string is for a Prometheus 2400 Modem. Its settings are:

<u>Generic Command</u>	<u>Factory Default</u>	<u>MRC1620 Setting</u>	<u>Function</u>
&C	&C0	&C1	0=DCD on always 1=DCD follows carrier
&D	&D0	&D2	DTR Options
&J	&J0	&J0	0=RJ/11/41S/45S 1=RJ/12/13 telephone jack
&L	&L0	&L0	0=pstn 1=leased-line telephone line
&W		&W	Write configuration to eeprom
B	B1	B1	0=CCITT V22 1=Bell 212 for 1200 baud
E	E1	E0	0=disable 1=enable command echo
L	L2	L1	0=1=low 2=medium 3=high speaker volume
M	M1	M1	0=off 1=until DCD 2=on 3=off dial/rem sig speaker
Q	Q0	Q0	0=enable 1=disable result codes
S0	S0=0	S0=0	0=disable n=# of rings until answer
V	V1	V0	0=terse 1=verbose result codes
X	X4	X4	Extended Result Codes
Y	Y0	Y0	0=disable 1=enable long space disconnect

Again, not all modems have the same commands available, so be sure to consult the manual that came with your modem for proper settings.

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MUST
LOCAL

3. OPERATION

We suggest that you read this manual while operating TaskMaster20 to learn the operation of the program.

It is assumed you have a working knowledge of the MRC1620 for the following discussions. Please review the MRC1620 Manual if you are unsure since MRC1620 operations are not covered in this manual except where enhancements exist.

(Note: The "Alt" key on a PC keyboard works just like a Shift key; for example, Alt-Z means hold down the Alt key and then press Z at the same time. <Enter> means press the Enter key on the PC keyboard.)

3.1 Starting TaskMaster20

To start the TaskMaster20, type the following DOS commands:

For a floppy disk:

A: <Enter>

For a hard disk:

C: <Enter>
CD \TM20 <Enter>

In either case follow this by:

TM20 /H

or

TM20 {SiteName} [/2 /2WIRE /30 /ACK /B {baudrate} /BIOS /C /DC /DR /DELAY {seconds} /DUR {tenths} /ID {siteID} /LR /M /NOANSWER /NOSNOW /NP /POLL /PW {password} /Q] <Enter>

All options should be on the same line, separated by blanks, and preceded by a slash (/), except for items in braces ({}). Do not type the brackets or braces. For example

TM20 KMAI /2 /B 2400 /PW TEST <Enter>

/H or /HELP or /?

causes a terse description page of the command line options to be displayed. The program does not begin. This can be used if you forget which options are available and you don't have the manual in front of you.

{SiteName}

causes the filenames beginning with {SiteName} to be used during this session of TaskMaster20. (For additional information on the files, see Section 4)

/2 or /COM2

forces the use of COM2 instead of COM1. (COM1 is the default.) This information can be put in the <SiteName>.NFO file.

/2WIRE

forces all communications to use a 2-wire leased-line protocol.

/30

causes automatic logging to download the MRC1620 30-hour log to disk.

/ACK

causes automatic logging to acknowledge all alarms after logging to disk.

/B {baudrate} or /BAUD {baudrate}

results in the use of the designated {baudrate}. The MRC1620 supports 2400, 1200, and 300 baud. (1200 is the default). This information can be put in the <SiteName>.NFO file.

/BIOS

forces the use of video BIOS routines for all screen output. This should only be used with a non-compatible video adapter/monitor. Use of this option will result in noticeably slower screen updates.

/C or /CONTROL

causes Automatic Control to be started when TaskMaster20 begins. This has the same effect as Alt-C while the program is running. (Auto Control disabled is the default.) See Section 3.9.

/DC or /DIRECT

allows the .NFO, .STP and .LOG files to be read and used for direct connection applications (connections made without a modem).

/DELAY {seconds}

causes the specified delay to occur between automatic control attempts.

/DIALRETRIES {number} or /DR {number}

uses {number} as the number of times to dial a site before giving up.

/DUR {tenths} or /DURATION {tenths}

causes {tenths} (in 1/10ths of seconds) to be used as the RAISE or LOWER relay "ON" time during automatic control. (10 is the default. The upper limit is 250.)

/ID {siteID}

uses {siteID} as the site number for connection to the MRC1620. This must be the same as the MRC1620 before TaskMaster20 will communicate with the MRC1620. This information can be put in the <SiteName>.NFO file.

/LOGRETRIES {number} or /LR {number}

number of times to dial an auto-log site before giving up.

/M or /MONO or /BW

causes all screen attributes (including colors) to be mapped into "black", "white", "blink" and "reverse". On machines that have monochrome monitors with Color Adaptors, this option will allow all characters that are written to the screen to be visible. Note that some display adapters perform their own mapping of colors and screen attributes. In this case, the program should be first tried without /MONO.

/NOANSWER

prevents the modem from answering incoming phone calls (overrides default).

/NOSNOW

can be used with CGA adapters to eliminate video "snow" on the screen. Use only if necessary since this will slow down screen updates.

/NP or /NOPRINTER

allows operation without a printer connected to the PC. All information that would normally be printed is written instead into a file on the disk.

/POLL

forces TM20 to do a full data poll during communications instead of the default exceptions-only poll. **Must** be used on one PC in a configuration of two PCs and one MRC 1620 to prevent polling errors. This simulates the CT's polling technique.

/PW {password} or /PASSWORD {password}

used in conjunction with SiteName causes an automatic connection attempt to the site using {password} as the password. There should not be embedded blanks in the password.

A note about passwords. The Monitor password allows you to obtain information from the MRC1620. The Control Password in addition allows you to perform RAISE and LOWER commands and acknowledge alarms. The Master Password allows you to perform MRC1620 Set Up. You should use the lowest password that will accomplish what you need to do.

Another note about passwords. Passwords are cAsE sensitive. Master is **NOT** the same as MASTER. DOS doesn't care. TaskMaster does.

/Q or /QUIET

prevents any audible response for alarms or unrecognized keys. This has the same effect as Alt-Q during program operation.

If you start the TaskMaster20 the same all the time, you can put the command line in a DOS batch file on your disk. For example, to put the file TM.BAT in the root directory of your hard drive, type the following (<F6> means press the F6 key on the keyboard):

```
C: <Enter>
CD \ <Enter>
COPY CON: TM.BAT <Enter>
C: <Enter>
CD \TM20 <Enter>
TM20 KMAI /2 /B 2400 /pw TEST <Enter>
<F6> <Enter>
```

Alternately, you can use DOS EDLIN to enter the last four lines of the above example. Please consult your DOS manual for more information on EDLIN and batch files.

In the above example, to start TaskMaster and dial the site KMAI using COM2 at 2400 baud using the password TEST, simply type *TM* <Enter> at the DOS prompt.

3.2 TaskMaster20 Screens

There are six screens available in the TaskMaster20. Each of the screens has on the top line a list of the screens and their associated function keys, followed by the date and time. The second line shows the TaskMaster20 banner and the current screen. The first character in this line indicates that audible responses are enabled and the last character indicates communications with the MRC1620. The third line is a message line, as are the last two lines on the screen. The remaining part of the screens are as follows:

- SYSTEM(F1)** Allows access to communications commands and displays Global commands. Display returns to MONITOR screen.
- MONITOR(F2)** Displays analog and status values and labels from the MRC1620. Allows monitoring of all parameters of the MRC1620 including hourly and alarm logging. Channels which are in automatic control are highlighted in yellow. Values in alarm condition are indicated in red.
- ALARMS(F3)** Displays further information about any alarms present in the MRC1620. Values in alarm condition are indicated in red.
- SETUP(F4)** Displays and allows set up of the communications parameters (SiteName, passwords, and auto-dial) and labels for the MRC1620.
- LOG(F5)** Displays and allows set up of a schedule of when and how often to automatically dial MRC1620s (up to 256) to log their data.
- AUTO(F6)** Displays and allows set up of the automatic control channels and conditions. When enabled the TaskMaster20 will attempt to control an analog channel within the specified limits or perform a command on a status change. After the tenth attempt at control the program will display and log an error message.

To move to a given screen, press the function key associated with that screen. (All screen names are listed at the top of the screen). Press ESC to return to the MONITOR screen. A second press of the function key pulls down the associated command menu, which shows the commands available for the displayed screen. When a menu is displayed, then either the LeftArrow or RightArrow keys may be utilized to jump between menus. To remove the command menu, press ESC. To return to the MONITOR screen, press ESC again.

SPACE IS AUTO ERASE ENTRY -

3.3 Global Commands

The global commands can be invoked from any screen. They are displayed on the SYSTEM (F1) pull-down menu.

Alt-B Terminate Connection (Bye)

Terminates the connection to the MRC1620 and places the modem "on hook" (ready to dial again).

Alt-C Toggle Auto Control

Causes TaskMaster20 to turn on and off Automatic Control. TaskMaster20 attempts to maintain the analog values of the controlled channels within the specified limits. Status alarms can cause specific command responses. The labels of those channels (analog and status) that have been entered into the Control Algorithm (using the AUTO mode accessed via function key F6) will appear in yellow when Auto Control is enabled. Those that have been given values for the upper and/or lower limits will be automatically controlled.

Alt-E Execute DOS Command

This command allows access to DOS, without the need to re-establish a MRC1620 connection. Note that the MRC1620 will disconnect after about 90 seconds. Type *EXIT* to return to TaskMaster20.

Alt-Q Toggle Quiet Operation

Turns on and off the audible response to alarms and unrecognized keystrokes. A musical note symbol appears near the upper left corner of the screen when not in Quiet mode.

Alt-Z Clear Type-ahead Buffer (Zap)

Immediately clears all characters from the keyboard command buffer.

The remainder of the commands are screen-specific and are active only for a particular screen display.

3.4 System (F1) Commands

Space Connect To A MRC1620

Dials a MRC1620 using a <SiteName>.NFO file. You are asked to enter a SiteName from a list of existing files. If the file does not exist, you will be asked for the Site Number (corresponding to the MRC1620 hardware) and Phone Number to dial. You will then be asked for the password. TaskMaster20 will then attempt to dial the MRC1620. If it fails to connect the first time, it will try two more times before aborting. Press ESC to abort the current dial attempt immediately.

Space Re-Connect To The MRC1620

This choice is only available while on-line. The log in sequence is re-transmitted to the MRC1620 WITHOUT dialing or disconnecting. This feature is useful if too much time (about 90 seconds or more) is spent in the DOS shell and the MRC1620 resets the password level. The site files are also re-loaded from disk.

0 Terminal Emulation

Enters "Conversation" mode with the selected COM port. Keyboard entries are output directly to the COM port and characters received from the COM port are output to the SCREEN. Press Esc to return to normal operation. This can be used to verify or modify modem operation or to manually dial-up a MRC1620 using a non-"AT" compatible modem.

1 Switch To COM1

Informs the PC that the modem is to be connected through COM1. The current Baud rate for the port in use is also displayed.

2 Switch To COM2

Informs the PC that the modem is to be connected through COM2. The current Baud rate for the port in use is also displayed.

Alt-K Kick-start The MRC1620 Clock

The first time the MRC1620 Battery Ram Time-Of-Day Clock is used, it must be given a "kickstart" to get it going. This is done at the factory before the MRC1620 is shipped, but is provided here in the event you must replace the battery ram or the clock is not running for some other reason.

Alt-P Get The Password Access Level

Returns the password access level. This will be either Master, Control, Monitor, or nothing. The password level determines which functions are available. See Section 3-10 for more information about passwords.

Alt-R Reset The MRC1620 Alarm or Log Data

Resets the MRC1620 Battery Ram Data. You will be asked if you want to reset alarm or log data. You might wish to do this after downloading the alarm or log data from the MRC1620 to avoid duplicate entries in your TODAYS.HST file. Alt-A and Alt-3 on the Monitor Screen download the alarm and log data respectively.

Alt-T Set The 1620 Time

Sets the Time-Of-Day (TOD) clock at the MRC1620. You will be asked to enter the time and date. The TOD clock is used to log hourly and alarm data. (24HR CLOCK)

Alt-V Get The 1620 Firmware Version

Gets the version number of the firmware installed in the MRC1620. "VFB"

Alt-X End Operation & Exit To DOS

Terminates the modem connection to the MRC1620, stops TaskMaster20 and returns to DOS.

Alt-Y Calibrate the MRC1620 Clock

Calibrates the clock by making it run faster or slower.

Alt- (Alt-minus) Stop the MRC1620 Clock.

Stops the clock to save power.

3.5 Monitor (F2) Commands

UpArrow

DownArrow Select Channel

Moves the selector bar to the channel that you would like to Raise or Lower. You can also select a channel directly by entering the 2-digit channel number.

PgUp/PgDn Switch Screens

Allows access to the Extended Status screen.

+ Raise

Performs RAISE on the selected channel. The RAISE command is continuously sent to the RT until you release the "+" key or press another key.

- Lower

Performs LOWER on the selected channel. The LOWER command is continuously sent to the RT until you release the "-" key or press another key.

***** Uncommand

Cancels the previous RAISE or LOWER command.

01-16 Direct Channel Selection

Alt-7 Report A/D Reference Value (CH 17)

Displays the Channel 17 A/D Reference value from the MRC1620 RT.

Alt-8 Report Data Quality (CH 18)

Displays the Channel 18 data quality values.

Alt-9 Report Failsafe Value (CH 19)

Displays the Channel 19 Failsafe Timer Value.

Alt-T Report 1620 Clock Time

Displays the RT Time-Of-Day (TOD) Clock. The TOD clock is used for hourly and alarm logging.

Alt-D Download Calibrations And Data

Downloads (Channels 1-16) calibration data and current values from the MRC1620.

Alt-S Save Calibration Data To Disk

Writes (Channels 1-16) calibration data to the disk file <SiteName>.CAL

Alt-U Upload Saved Calibration Data

Uploads (Channels 1-16) calibration data from the disk file <SiteName>.CAL to the MRC1620.

Alt-A Download Alarm Log Data

Downloads alarm log data from the MRC1620 Battery Ram and writes the data to the disk file TODAYS.HST and to the printer. Up to the 20 latest alarms are stored at the MRC1620. Alt-R on the System Menu resets the MRC1620 alarm data.

Alt-3 Download 30-Hour Log Data

Downloads up to 30 hours of hourly log data from the MRC1620 Battery Ram and writes the data to the disk file TODAYS.HST and to the printer. The log data is stored in "first-in, first-out" format so only the latest 30 hours of information is retained in battery ram. Therefore, to obtain continuous log data, you must download the data at least once every 30 hours. Alt-R on the System Menu resets the MRC1620 log data.

Alt-L Log Current 1620 Status

Downloads the current analog and status values and writes the data and the associated channel labels to the disk file TODAYS.HST and to the printer.

Alt-M Manual Entry To Log

Allows you to manually enter a single line into the log (both TODAYS.HST and the printer).

Alt-W Watch Duty Change

Allows the current watch-person's identification to be entered into the log (both TODAY.S.HST and the printer. This identification also precedes all subsequent manual log entries.

F10 Acknowledge Alarms

Acknowledges all alarms from the MRC 1620

3.6 Alarm (F3) Commands

Up Arrow Select Channel

Down Arrow

Moves the selector bar to the channel you would like to Raise or Lower.

PgUp/PgDn Switch Screens

Allows access to the Extended status screen.

+ Raise

Performs RAISE on the selected channel. The RAISE command is continuously sent to the RT until you release the "+" key or press another key.

- Lower

Performs LOWER on the selected channel. The LOWER command is continuously sent to the RT until you release the "-" key or press another key.

*** Uncommand**

Cancels the previous RAISE or LOWER command.

Alt-A Download Alarm Log

Downloads the alarm log and writes the data to disk.

F10 Acknowledge Alarms

Acknowledges all alarms from the MRC1620.

3.7 Setup (F4) Commands

UpArrow
DownArrow
LeftArrow
RightArrow Select Field

Moves the selector bar to the field that you would like to edit.

Pg Up
Pg Dn Switch Screens

Switches between the two set-up pages. The first screen has the Site Name, Passwords, and Autodial information. The second has the Analog Titles, Analog Units, Status Titles, Status ON, and Status OFF fields. The second page fields are only used for TaskMaster20 display, and not MRC1620 operation.

Enter Change Contents Of Field

Input characters desired within the field. Use Backspace to delete characters. End the input with the Enter (or Return) key. Esc restores previous information.

Alt-S Save Setup To Disk

Writes all of the strings that are currently being displayed on the screens to be written to the disk file <SiteName>.STP.

Alt-D Download Setup

Downloads Set-up fields from the MRC1620.

Alt-U Upload Setup

Uploads Set-up fields to the MRC1620 from program memory

3.8 Log (F5) Commands

UpArrow
DownArrow
LeftArrow
RightArrow Select Field

Moves the selector bar to the field that you would like to edit.

PgUp
PgDn Change Screen

Changes to the next (previous) log screen.

Enter Change Contents Of Field

Input characters desired within the field. Use Backspace to delete characters. End the input with the Enter (or Return) key. Esc restores previous information.

Alt-S Save Setup To Disk

Writes all of the strings that are currently being displayed on the screens to be written to the disk file <SiteName>.LOG.

3.9 Auto (F6) Commands

UpArrow
DownArrow
LeftArrow
RightArrow Select Field

Moves the selector bar to the field that you would like to edit.

R RAISE

Cause a Raise command to be entered into the control algorithm.

L LOWER

Cause a Lower command to be entered into the control algorithm.

01-

16 Channel Number

Enter Change Contents Of Field

Input Raise or Lower and the channel number desired within the field. Use Backspace to delete characters. End the input with the Enter (or Return) key.

Alt-S Save Algorithm To Disk

Writes all of the algorithms that are currently being displayed on the screens to be written to the disk file <SiteId>.NFO.

Alt-C Toggle Auto Control

Causes TaskMaster20 to turn on and off Automatic Control. TaskMaster20 attempts to maintain the analog values of the controlled channels within the specified limits. Status alarms can cause specific command responses. The labels of those channels (analog and status) that have been entered into the Control Algorithm (using the AUTO mode accessed via function key F6) will appear in yellow when Auto Control is enabled. Those that have been given values for the upper and/or lower limits will be automatically controlled.

3.10 Notes on Setup

General

In general, use the cursor keys (Up-, Down-, Left-, and Right-Arrow) to move from field to field. To change pages on the Setup (F4) or Log (F5) screens, use Pg Up and Pg Dn. Use <Enter> to save the information for the current session of TaskMaster20. If you make an error during entry, pressing Esc will restore the previous information. If you wish to save the information for future sessions, you must save the set-up information to disk (Alt-S) for each screen: Monitor (F2), SetUp (F4), Log (F5), and Auto (F6). Don't forget to Upload the setup (F1) information to the MRC1620 (Alt-U).

A note about passwords. All three levels of password (Master, Control, and Monitor) allow you to download information from the MRC1620. Most set-up information can only be uploaded with the Master password. Passwords can only be changed and uploaded by the same or higher level of password. E.g., the Monitor password can be changed by the Control password level, but not vice-versa.

SETUP (F4)

For the SETUP (F4) screen, the SiteName must match the <SiteName>.NFO file if you intend to use the MRC1620 Auto-Dial Feature. This is how TaskMaster20 determines which MRC1620 is calling. There cannot be any imbedded spaces in the SiteName.

Each password can be any combination of up to 12 characters. There cannot be any imbedded spaces in the passwords. If you do not want to have your Master password appear in the disk file, perform set up in the following order: 1) Dial the MRC1620 using the Master password. 2) Do your set up on the SETUP (F4) screen. Upload the set up to the MRC1620. [Optionally download the set up from the MRC1620 to verify.] 3) Terminate the connection to the MRC1620. 4) Dial the MRC1620 using the Monitor password. 5) Download the Set Up information on the SETUP (F4) screen. 6) Save the set-up information to disk. The factory default passwords are Master, Control, and Monitor.

Set Answer On Ring to the number of rings you want the MRC1620 to wait before answering. This is useful if you want to use the same phone line for voice communications when the MRC1620 is not using the line.

Auto-dial is ENABLED or DISABLED by entering E or D, respectively.

Enter up to 10 phone numbers of TaskMaster20 installations. If the first TaskMaster20 cannot be reached, the MRC1620 will try the second, then the third, etc. The phone number consists of up to 12 digits (0-9) and commas. The comma represents a pause (the "AT" default is 2 seconds) during dialing (e.g. to wait for a secondary dial tone). To use Pulse instead of Tone (DTMF) dialing, put a "P" at the beginning.

The second page is used for labels on the MONITOR, ALARM, and AUTO screens and for logging information. Enter the information as you want it to appear on those screens.

LOG (F5)

For the LOG (F5) screen, SiteName must match the <SiteName>.NFO file if you want TaskMaster20 to log while you are currently talking to that site. There cannot be any imbedded spaces in the SiteName.

SiteID # must match the MRC1620 hardware site number.

Telephone Number is the phone number of the MRC1620. The phone number consists of up to 20 digits (0-9) and commas. The comma represents a pause (the "AT" default is 2 seconds) during dialing (e.g. to wait for a secondary dial tone). To use Pulse instead of Tone (DTMF) dialing, put a "P" at the beginning of the portion to be pulse dialed.

Password is one of the three passwords for the MRC1620. We recommend you use only the Monitor password for security (unless you are using the /ACK feature).

FROM and TO are the beginning and end of the interval over which the TaskMaster20 will dial the MRC1620. Times are entered in 24-hour format.

EVERY is the interval between logs, expressed in hours and minutes.

AUTO (F6)

This screen is used to set up the Auto-Control conditions for <SiteName>. Remember that /DUR on the command line will set the command Duration.

AV>UL is the command to issue when the analog value is greater than the upper limit (typically Lower on the same channel).

AV<LL is the command to issue when the analog value is less than the lower limit (typically Raise on the same channel).

SV On is the command to issue when the status value is ON (typically Lower on the same channel).

SV Off is the command to issue when the status value is OFF (typically Raise on the same channel).

3.11 MRC1620 Operation

There are a few differences in operation of the MRC1620 with the use of TaskMaster20.

Fail-safe operates as follows:

If the HW line and the PC line (the one used to connect to the PC, with or without a modem) data quality drop to 0, the Fail-safe countdown will begin from the user-defined (at the RT) initial value. If the countdown timer has 3 or less minutes remaining, an alarm occurs on channel 19 of the RT. At the RT, this can trigger the MRC1620 to dial a PC if it has been set up and uploaded with the SETUP (F4) screen. If the timer reaches 0, another alarm occurs on channel 19.

You should set the countdown initial value on the RT to just over the length of time that you regularly intend to dial the RT. E.g, set the initial value to 185 if you are going to dial the RT every three hours, or 1445 if you are going to dial the RT every 24 hours. This way, if you forget to call the RT, the RT will call you.

Please consult the FCC Rules and Regulations for the legality of your intended mode of operations regarding Fail-safe.

The Command Hierarchy with TaskMaster20 is as follows. Front Panel commands take precedence over commands coming in on a communications port. Commands issued from the CT (including attached PCs) have precedence over commands issued from the RT attached PC. The HW port takes precedence over the PC port. This results in the following order of priorities:

- 1) RT front panel commands (when in Maintenance Override)
 - 2) CT and attached PC commands (with 10-second timeout)
 - 3) RT PC (TaskMaster20) commands.
-
- 2a) CT front panel commands (with 5-second timeout)
 - 2b) CT PC (TaskMaster20) commands

3.12 Summary of Operations

Starting the program:

```
TM20 {SiteName} [/2 /2WIRE /30 /ACK /B {baudrate} /BIOS /C /DC /DR //DELAY  
{seconds} /DUR {tenths} /ID {siteID}/LR /M /NOANSWER /NOSNOW /NP /POLL/  
PW {password} /Q] <Enter>
```

Global Commands

ESC Removes Pull-Down Menu
ESC Returns To Monitor Screen
ESC When changing a field restores previous information
Alt-B Terminate Telco Connection (Bye)
Alt-C Toggle Auto Control
Alt-E Execute DOS Command
Alt-Q Toggle Quiet Operation
Alt-Z Clear Type-ahead Buffer (Zap)

System (F1) Commands

Space Connect To A MRC1620
Space Re-Connect To The MRC1620
0 Terminal Emulation
1 Switch To COM1
2 Switch To COM2
Alt-K Kick-start The MRC1620 Clock
Alt-P Get The Password Access Level
Alt-R Reset The MRC1620 Alarm or Log Data
Alt-T Set The 1620 Time
Alt-V Get The 1620 Firmware Version
Alt-X End Operation & Exit To DOS
Alt-Y Calibrate the MRC1620 Clock
Alt- (Alt-minus) Stop the MRC1620 Clock.

Monitor (F2) Commands

PgUp/PgDn Switch Screens
01-16 Direct Channel Selection
+ Raise
- Lower
***** UnCommand
Alt-7 A/D Reference Value (CH 17) *2046*
Alt-8 Data Quality (CH 18) *0 99*
Alt-9 Fail-safe Value (CH 19)
Alt-T Report 1620 Clock Time
Alt-D Download RT Calibrations And Data
Alt-S Save 1620 Calibration Data To Disk
Alt-U Upload Saved Calibration Data
Alt-A Download Alarm Log Data
Alt-3 Download 30-Hour Log Data
Alt-L Log Current 1620 Status
Alt-M Manual Entry To Log
Alt-W Watch Duty Change
F10 Acknowledge Alarms

Alarm (F3) Commands

UpArrow
DownArrow Select Channel
+ Raise
- Lower
***** UnCommand
Alt-A Download Alarm Log Data
F10 Acknowledge Alarms

Setup (F4) Commands

Pg Up
Pg Dn Switch Screens
UpArrow
DownArrow
LeftArrow
RightArrow Select Field
Enter Change Contents Of Field
Alt-S Save Setup To Disk
Alt-D Download Setup From RT
Alt-U Upload Setup To RT

Log (F5) Commands

Pg Up
Pg Dn Change Screen
UpArrow
DownArrow
LeftArrow
RightArrow Select Field
Enter Change Contents Of Field
Alt-S Save Setup To Disk

Auto (F6) Commands

UpArrow

DownArrow

LeftArrow

RightArrow Select Field

R RAISE

L LOWER

01-

16 Channel Number

Enter Change Contents Of Field

Alt-S Save Algorithm To Disk

Alt-C Toggle Auto Control

4. FILE STRUCTURE

4.1 .NFO files

This file is used by the TaskMaster20 to dial an MRC1620 and for Auto-Control of the MRC1620. The beginning of a typical <SiteName>.NFO file might look like this:

```
TELEPHONE: 9,18003384219 9,584-8032
MODEM INIT: {optional}
MODEM INIT: {optional}
CARRIER WAIT: 90 30
SITE ID: 0 1
COM PORT: 2 1,3,4,0,0
BAUD RATE: 2400 1200
Ch Analog Labels AV>UL AV<LL Anlg Units Status Labels SV On SV Off
1 "Power Out " "R01" "L01" "Percent " "Transmitter #1 " "L16" "R16" "ON" "off"
```

The first line in the .NFO file contains the telephone number of the MRC1620. The phone number consists of digits (0-9) and commas. The comma represents a pause (the "AT" default is 2 seconds) during dialing (e.g. to wait for a secondary dial tone). To use Pulse instead of Tone (DTMF) dialing, put a "P" at the beginning of the portion to be pulse dialed.

Optional modem initialization lines (up to 2) can be inserted after the first line. These lines can be used for initializing modems which are Hayes "mostly compatible".

The second line is the carrier wait--the amount of time TaskMaster20 waits from the beginning of the dial sequence to carrier detection with the other modem before retrying or generating error messages. The default is 30 seconds.

The third line contains the SiteID--This must correspond to the MRC1620 hardware before communication will occur.

The fourth line indicates which PC COM Port will be used for communications with the MRC1620. The default is COM port 1.

Non-standard COM ports are supported by adding more parameters on the line. Example:

```
COM PORT: 3,100,5
```

This describes COM3 as having a base address of 100H (hexadecimal) and using IRQ5 as its hardware interrupt.

The fifth line tells TaskMaster20 at what baud rate to talk to the MRC1620. This must correspond to jumper H3 on the MRC1620 CPU board. The default is 1200 baud.

The remainder of the file is used for Auto-Control and is not normally edited since you can edit this information from the Auto (F6) screen during normal operations.

The sixth line is a heading line for the Auto-Control lines.

The remainder of the file contains Auto-Control information used by the program and channel labels so you can review the Auto-Control conditions. The labels used by the program are stored in SiteName.STP.

The other fields are used by Auto-Control:

AV>UL is the command to issue when the analog value is greater than the upper limit.
AV<LL is the command to issue when the analog value is less than the lower limit.
SV On is the command to issue when the status value is ON.
SV Off is the command to issue when the status value is OFF.

4.2 .STP Files

<SiteName>.STP is created by "Save Setup To Disk" from the SETUP (F4) screen. These files are edited normally from the SETUP screen. The following is a table of character lengths for each field:

<u>Field</u>	<u>Length</u>
Site Name	8
Passwords	12
AutoDial	ENABLED/DISABLED only
Answer on ring:	1
Telephone Numbers	12
Analog Labels	16
Analog Units	8
Status Labels	16
Status ON Labels	8
Status OFF Labels	8
Extended Status Labels	24
Extended Status ON Labels	8
Extended Status OFF Labels	8

4.3 .LOG Files

The <SiteName>.LOG file contains an image of the fields on the LOG (F5) screen and is created by "Save The Logging Setup" on that screen. This file is normally edited from the LOG (F5) screen. The fields are:

<u>Field</u>	<u>Length</u>
SiteName	8 characters
ID #	3 digits max
Telephone Number characters)	20 characters (may contain MODEM control
Password	12 characters
From	4 digits max
To	4 digits max
Every	4 digits max

4.4 .CAL Files

The <SiteName>.CAL file contains the MRC1620 calibration data. It is created by "Save RT Calibration Data To Disk" from the Monitor (F2) screen. This file should not be edited.

4.5 .HST Files

The file `TODAYS.HST` contains a running history of TaskMaster20 operations. All information downloaded from the MRC1620 (except setup) is written to this file (including periodic logs). Watch Changes and Manual Entries are also recorded here.

`TODAYS.HST` is opened each time TaskMaster20 is started. If the date on the file is not today's date, the file is closed and renamed with the date of the file. A new `TODAYS.HST` is then opened. Each day's operation will then be contained in a single file on the disk.

4.6 Archival History Storage

It is advisable to periodically copy the .HST files from your hard disk to floppy disk for "permanent" storage. To do this, put a blank, formatted disk in drive A and then at the DOS prompt type:

```
C: <Enter>  
CD \TM20 <Enter>  
COPY *.HST A: <Enter>
```

If all the files were successfully copied (DOS will tell you if they were not), you can delete the files from your hard disk by typing

```
DEL *.HST <Enter>
```

You should archive your files once a week (or month or day), depending on how reliable you think your hard drive is. Data has been known to be lost from PCs. See your DOS manual for information on the disk `FORMAT A: [/V]` command.

You can also backup your `<SiteName>.*` files in the same manner.

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5. CUSTOMER SERVICE INFORMATION

Moseley Associates, Inc. has a Technical Services Department to assist Moseley product users who experience difficulties. Our service is available at two levels: telephone consultation, and factory service. Different circumstances apply whether the product(s) are under Warranty/Service Agreement or are outside Warranty/Service Agreement status.

Please read the manual; a large portion of telephone calls to Moseley request information which is needed due to nonfamiliarity with the equipment. The majority of those questions are already answered by the Installation/Operation sections of this manual. If these do not help your problem, the first step in any factory service transaction should always be telephone consultation.

Telephone Consultation

If telephone assistance is necessary, please have the following information available prior to calling the factory:

- A. Model Number and Serial Number of unit.
- B. Shipment date or date of purchase of an Extended Service Agreement
- C. Suspected module identification markings.
- D. Be prepared to accurately describe the problems with the unit: Constant or intermittent? Precise symptoms? Meter readings? Operational frequency of unit?
- E. Factory test data, if applicable.

Once you are prepared with the above-requested information, contact our Technical Services Department for assistance. A Technical Services Representative who knows your product(s) is available during normal work hours (8:00 a.m. to 5:00 p.m., Pacific time, Monday thru Friday). Please have patience if the particular representative you should talk to is busy. Leave your name, call letters, equipment type and telephone number(s) where you can be reached in the next few hours. Someone will get back to you as soon as possible.

Please be prepared to keep telephone consultations as short as possible in order to free up the Technical Service Representative to help someone else in trouble. Usually the Technical Service Representative will make suggestions and recommendations for your next step. After trying these, you may call back if you continue to experience problems.

For telephone assistance call **(805) 968-9621**

After Hours Emergency (Only) Telephone Consultation

Emergency service is provided from 5:00 p.m. to 10:00 p.m, Pacific Time, Monday to Friday, and from 8:00 a.m. to 10:00 p.m., Pacific Time, on weekends and holidays. For telephone assistance call (805)968-9621.

This after hours service is for emergencies only. Please do not expect our representative to know the status of your order, to take parts orders or to be equipped to help with installation problems.

Factory Service

Arrangements for factory service can be made after consultation with the factory Technical Service Representative and his assignment to you of a Return Authorization (R.A.) Number. This number expedites your equipment's routing from the Receiving Department to Technical Services.

When returning your equipment to Moseley Associates, the following suggestions are offered to assist you. If you are returning a module, ensure that the module is packed sufficiently to withstand the rigors of the journey. Make sure the shipping carton is packed evenly and fully, with packing material filling all voids so that the module cannot shift inside the shipping carton. The package should also be marked in red with the words "Electronic Equipment" or "Fragile". Remember, the condition of the module is totally dependent on the care taken in the packing. Reference the return order number that you had previously obtained from the factory on the outside of the carton or on the shipping label. Make sure that the name of your company is listed on the shipping label, and insure your module appropriately.

If you are shipping a complete chassis, all modules should be tied down as they were originally received. On some Moseley Associates equipment, shipping screws are required on the underside or topside of the chassis. In this case, printing on the chassis will indicate where such screws should be installed and secured.

Include any and all descriptions of the difficulties encountered with your equipment in the field. This will greatly assist us in processing your equipment and returning it as expeditiously as possible.

Use the original shipping carton in which your equipment was supplied if possible. Ensure that the carton is packed evenly and fully, with packing material filling any voids so that the chassis cannot shift inside the carton. Make sure the carton is sealed properly with either nylon-reinforced tape or shipping sealing tape. Mark the outside of the carton "Electronic Equipment - Fragile" in big, red letters. This will assist the survival of the equipment in the shipping process. Again, bear in mind that the survival of the unit depends almost solely on the preparation taken in shipping it.

When returning your equipment to our factory, please address it to the following:

**MOSELEY ASSOCIATES, INC.
Attn: Technical Services Department
111 Castilian Drive
Santa Barbara, CA 93117-3093**

Display your return order number clearly on the shipping label, and insure the equipment for the appropriate amount.

All equipment must be shipped prepaid; Moseley Associates, Inc. will return the equipment prepaid under Warranty and Service Agreement conditions, and either freight collect or billed for equipment not covered by Warranty or a Service Agreement.

GENERAL

Replacement Modules

Moseley Associates encourages the purchase of recommended spare parts kits to allow the customer to be totally self sufficient with regard to parts. We recognize that there are extenuating circumstances when troubleshooting to the component level is neither practical nor possible. If this is the case, replacement module exchange may be the most expedient way of correcting the problem. Each product manual lists recommended spares.

Non-frequency sensitive replacement modules are normally available for immediate shipment. If you require a replacement module from Moseley Associates, please give your shipping address to our Technical Services Engineer. If the module or equipment to be supplied to your company is to be held at the airport with a telephone number to call, provide at least two telephone numbers. This will often expedite the delivery or pickup of the replacement module or equipment.

Field Repair

Always try to isolate the problem to a specific area or module, if possible. By comparing actual wave shapes and levels with those referenced on the block and level diagrams or schematics, the problem often can be localized to the component level.

If an integrated circuit is suspect, carefully remove the original and install the new one in the same direction. These devices are installed one way only. Installing a new device backward may damage the newly-installed component or the surrounding circuitry. ICs occasionally exhibit temperature-sensitive characteristics. If a suspicious device operates intermittently, or appears to drift, Freeze Mist may aid in diagnosing the problem.

If a soldered component has to be removed from a printed circuit board, do the following:

Use a 40 W soldering iron with a 1/8-inch tip. Do not use a soldering gun. Excessive heat may cause damage.

Remove all solder contacting the lead or leads from the component and from the associated printed circuit pad. To assist in the removal of the solder, a solder-sipping braid such as solder wick is very useful. Once the solder has been removed, remove the component from the board.

When installing the new component, prebend the leads of the replacement component so they will easily fit into the appropriate PC board holes. Solder each lead of the component to the bottom side of the board with a 40 W soldering iron with a 1/8-inch tip. Always use a good brand of rosin-core solder. The solder joint should be smooth and shiny. Also, be sure that excessive heat is not used in this soldering operation. Excessive heat will damage the printed circuit pad that comes in contact with the new component. Finally, cut each lead of the replacement component close to the solder on the pad side of the printed circuit board with a pair of diagonal cutters. Then remove all residual flux with either flux cleaner or a cotton swab moistened with flux cleaner.

Moseley 13135

805, 968-1602

PW=

COMM 4 = 4, 2E8, 3, 0, 0

I:/ Moseley

TM20 GENOA/PW MASTER
CONTROL
MONITOR

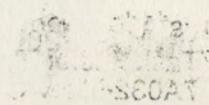
Moseley TECH
Steve

Moseley
WI

&DI/ BI EØ QØ VØ X4 SØ=1

PC PLUS

AT & FE1VIX4 & CI & D2 SØ=Ø



6. SCHEMATICS AND ASSEMBLIES

6-1	25F-25M Modem Cable	24C1099
6-2	9F-25M Modem Cable	24C1167
6-3	9F-25F Null Modem Cable	24C1170
6-4	9F-9F Null Modem Cable	24C1171

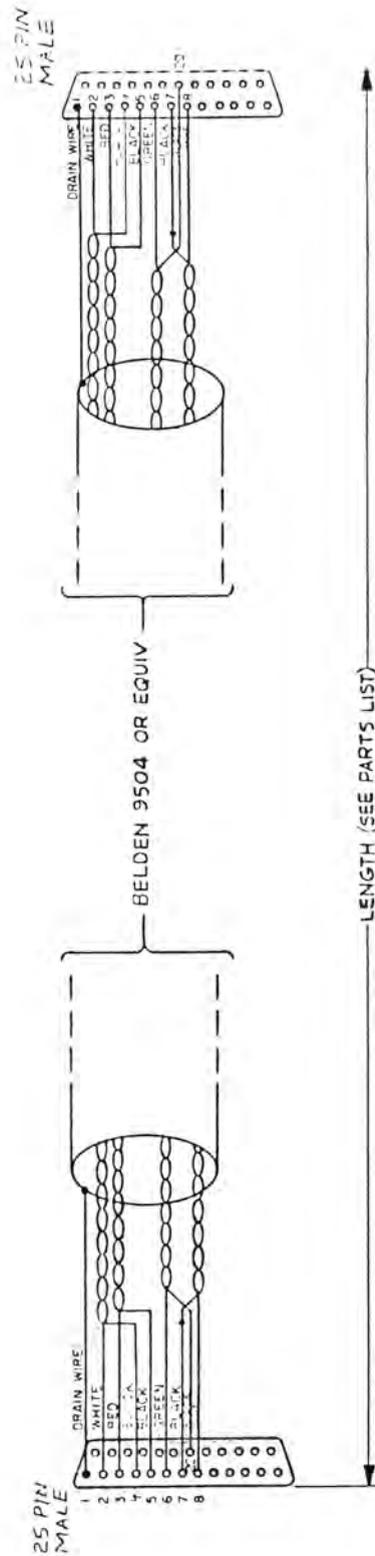
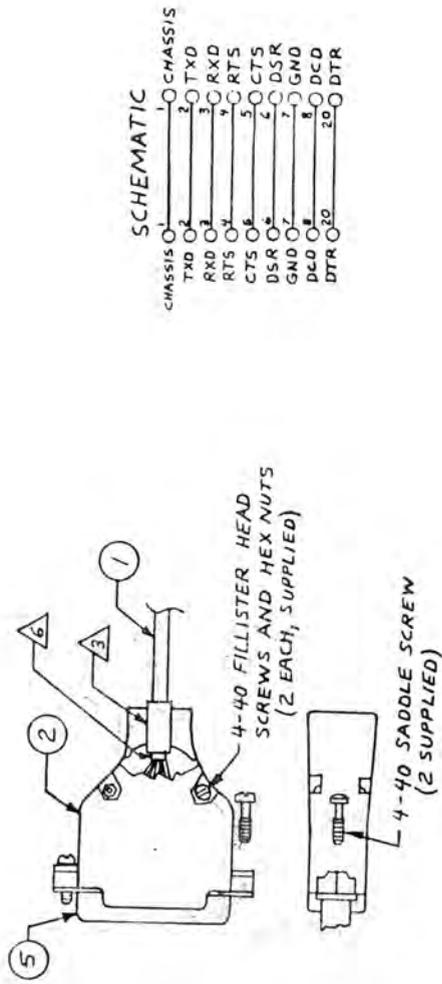


Figure 6-1
25F-25M Modem Cable
24C1099

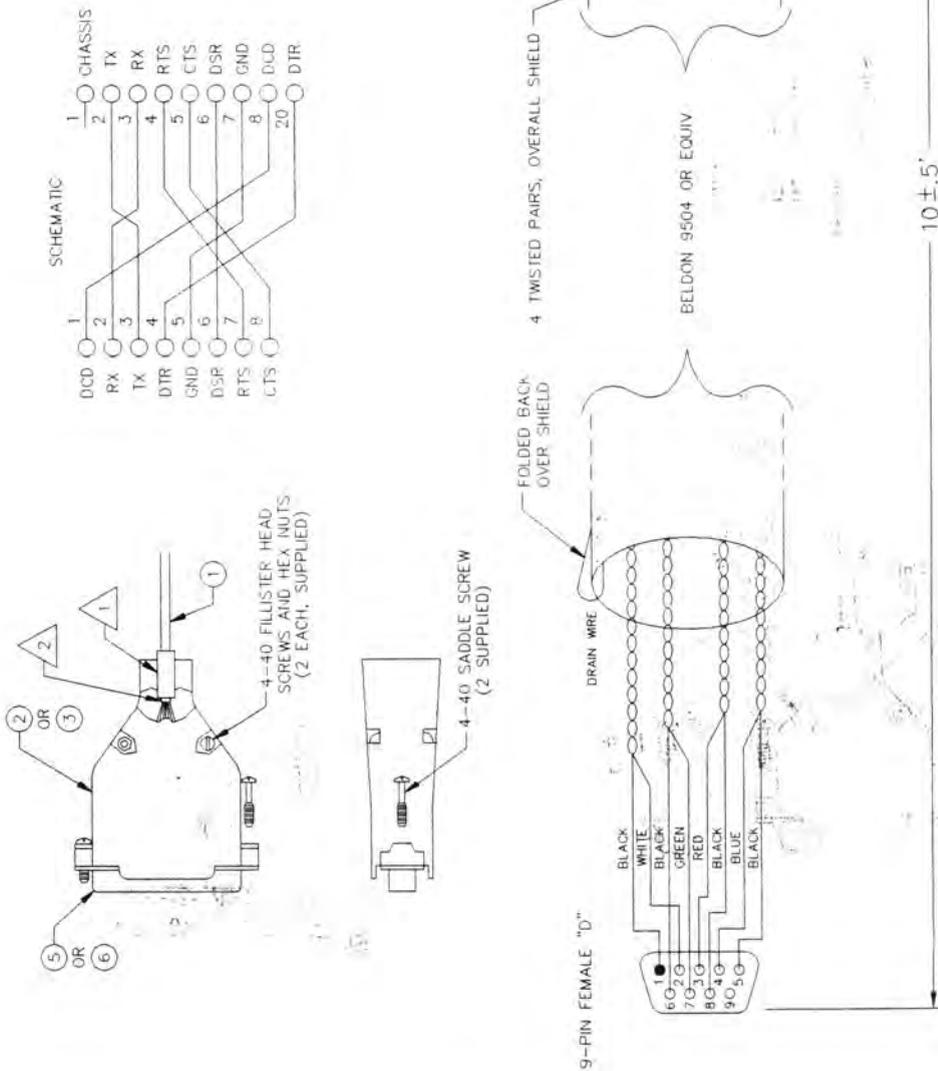


Figure 6-2
9F-25M Modem Cable
24C1167

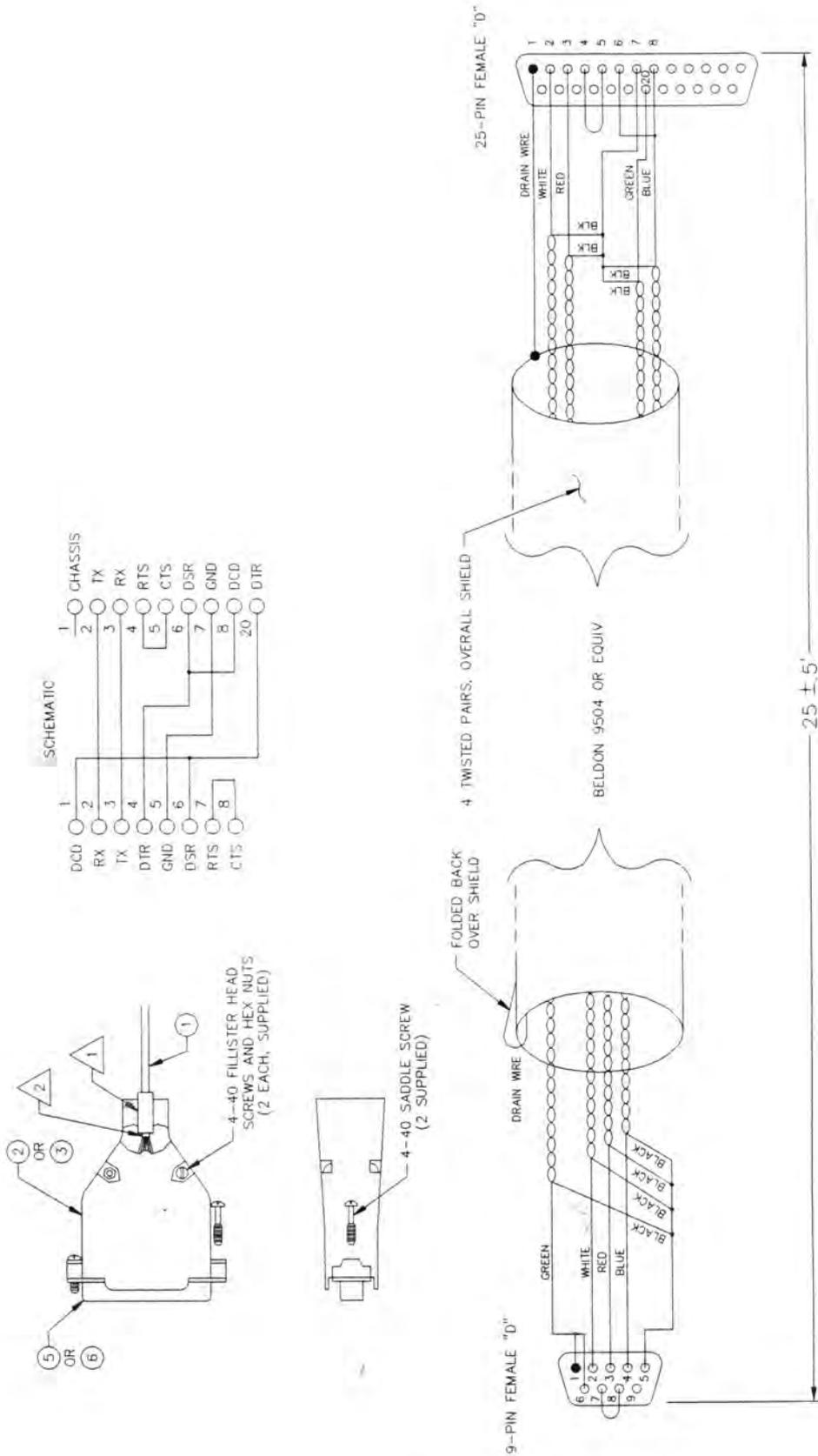


Figure 6-3
9F-25F Null Modem Cable
24C1170

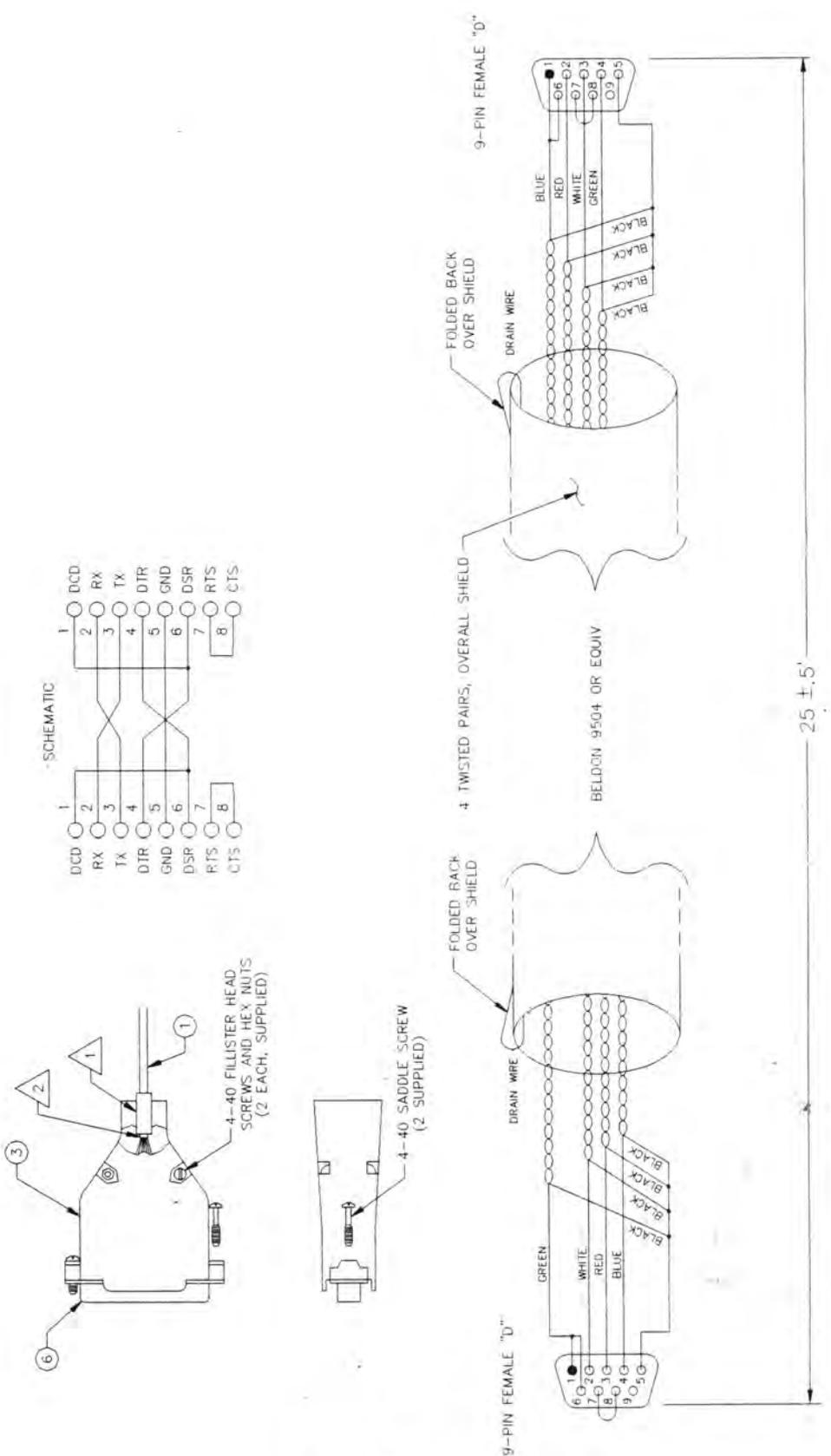


Figure 6-4
9F-9F Null Modem Cable
24C1171

7A0326
 Rev C