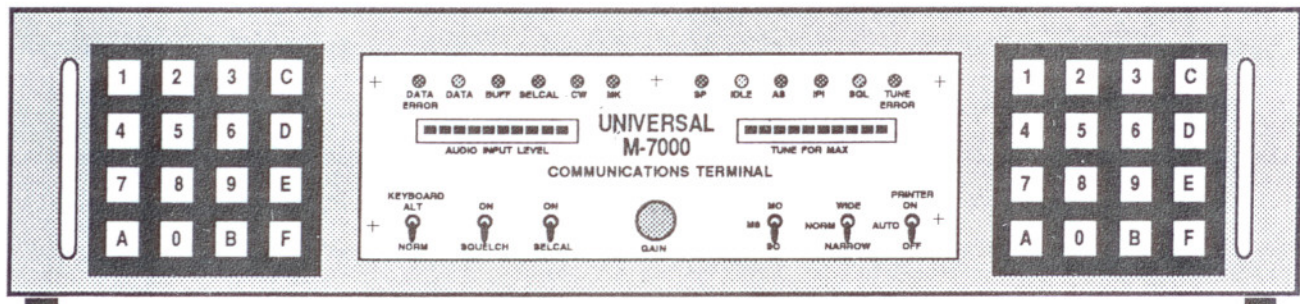


# Getting Started With The Universal M-7000

Version 2



FIRST EDITION  
By  
Fred Osterman

Universal Radio Research  
1280 Aida Drive  
Reynoldsburg, Ohio 43068

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By  
*Fred J. Osterman*

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**FIRST EDITION**

**FIRST PRINTING**

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Reynoldsburg, Ohio

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## 1.0 INTRODUCTION

Have you ever glanced at the cockpit of a commercial jet liner as you boarded the plane? The number of dials, controls and indicators looks absolutely overwhelming and extremely complicated! On the other hand, if the captain were to remove one of the panel meters and hand it to you (...hopefully not in flight), chances are that not only could you identify its function, but with some additional explanation be able to comprehend its use.

Operating the M-7000 is not as difficult as flying an airplane. However, if one were to sit in front of the unit and try to learn all the controls at once, the results would be unproductive and frustrating. Trying to operate this device without reading the manual will simply be futile.

We want you to be up and running as quickly as possible. We would like you to start getting *real* results from your M-7000 almost immediately. Most importantly, we want your skills to progress logically and your understanding of this device to increase smoothly.

The Universal M-7000 Owner's Manual contains complete technical description of this device and its use. The novice user may initially find the supplied Owner's Manual slightly overwhelming. Therefore, this Getting Started manual should be read first. While it will not provide the depth of knowledge that the main manual offers, it will allow a preliminary understanding of the device, and make the eventual understanding of the Owner's Manual easier.

This manual reflects all the enhancements of the M-7000 version 2, but will refer to the device simply as the "M-7000".

## 2.0 RECEIVER HOOKUP

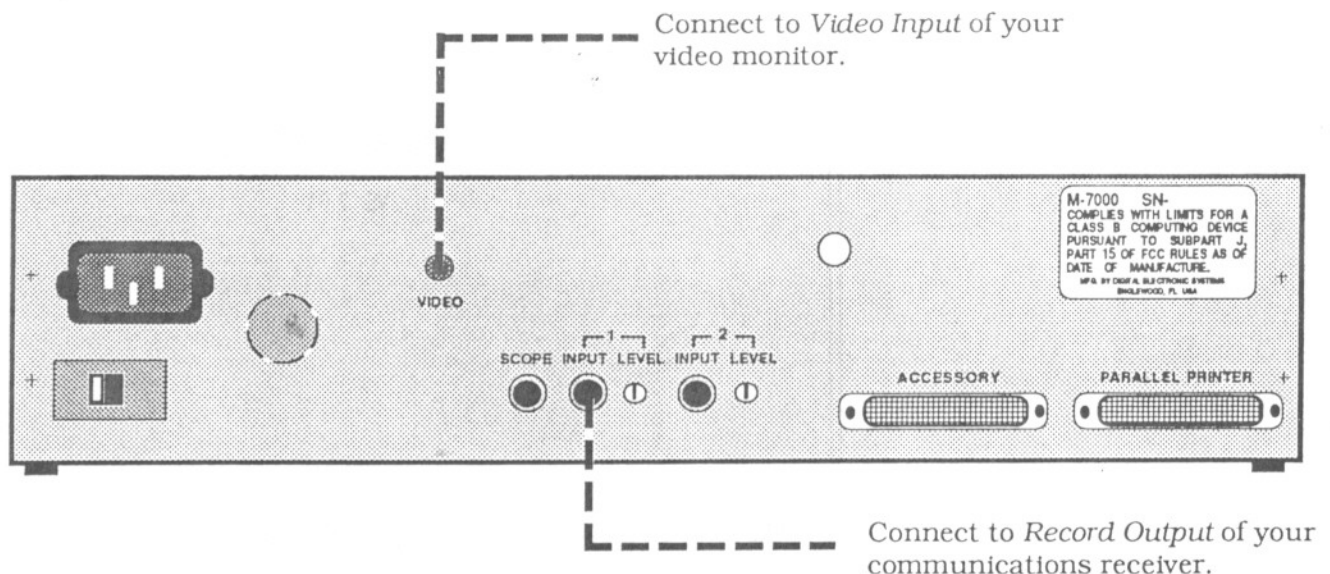
Any good quality communications receiver can be used with the M-7000. The receiver must exhibit good sensitivity, selectivity and stability. Examples of suitable receivers would include:

- Kenwood R-1000
- Yaesu FRG-7000
- Icom R-70
- Kenwood R-2000
- Yaesu FRG-7700
- Icom R-71A
- Kenwood R-5000
- Yaesu FRG-8800
- JRC NRD-515
- JRC NRD-525

The best point of connection to your receiver would be the *Record* or *Line Out* jack. This provides the proper volume to feed the M-7000. Also using these jacks will not disable your main speaker, This way you can still "hear" the signal through your radio as you tune it. The cable from your radio will go to the **INPUT 1** jack on the back panel of the M-7000.

## 3.0 MONITOR HOOKUP

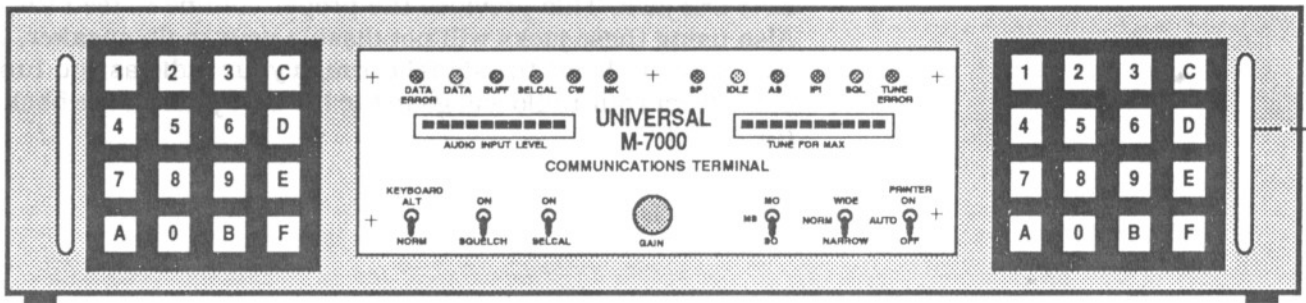
The M-7000 requires a video monitor to display the incoming text and the status line (to be discussed later). Most 12" (monochromatic) composite video monitors will work. The following monitor types are not recommended: color monitors, TTL, RGB, VGA, EGA monitors. Converted televisions are not recommended and may present a shock hazard. Use a shielded coax cable with appropriate connectors to connect the **VIDEO** jack on the back panel of the M-7000 to the video input of your monitor. We will concern ourselves with the printer hookup later.



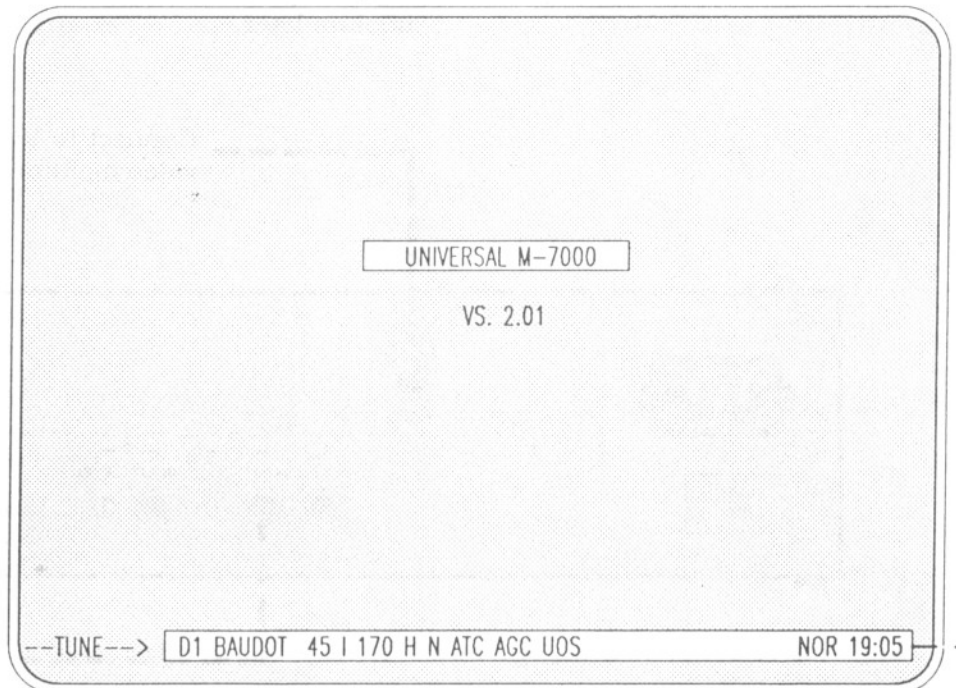
## 4.0 POWER UP

Before we turn on the M-7000, check the voltage select switch on the back of the M-7000. It is located below the AC cord. It should be set for **115V** for use in the United States. Users in some other countries may need to set this to the 230V position.

The power switch is located behind the right handle. Push it up for ON.



Turn your video monitor on. Adjust your monitor's vertical and horizontal centering controls so that the status line is fully visible as shown below. This may take careful adjustment especially on monitors smaller than 12". The numbers on your screen will be slightly different than shown.



The Status Line

## 5.0 THE STATUS LINE

The status line is very important. It tells you exactly what your M-7000 is currently set to do. The full Owner's Manual will explain the status line in detail. At this time we will only briefly identify and discuss the key positions:

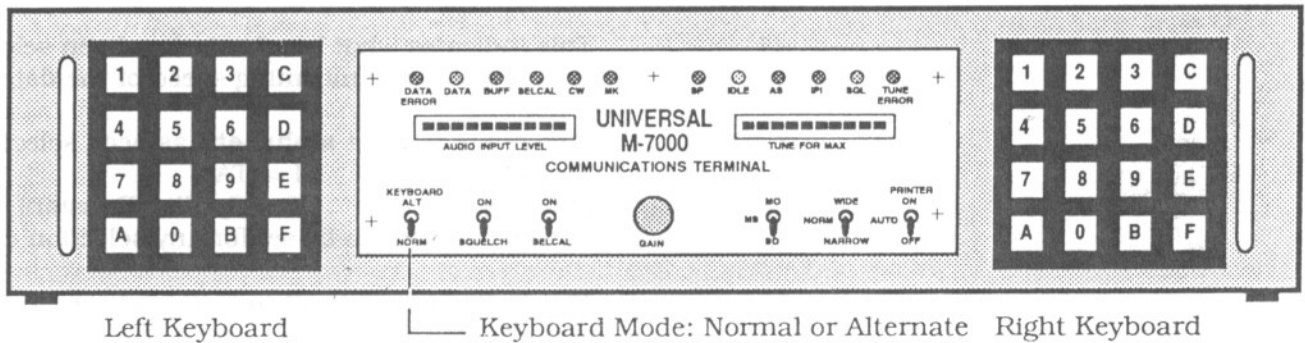
```
--TUNE--> D1 BAUDOT 45 I 170 H N ATC AGC UOS NOR 19:05
```

--TUNE-->	This is a <b>tune indicator</b> which indicates signal strength and "mirrors" the LED bargraph indicator.
D1	This indicates which <b>audio input</b> is selected. It should say D1.
BAUDOT	This indicates what <b>mode</b> of reception the M-7000 is presently set for.
45	This indicates what <b>baud rate</b> has been selected. This refers to the incoming speed of the data.
I	This refers to what <b>alphabet</b> has been selected. T = Telex                      I = ITA M = Mil                        C = Cyrillic (Russian) At this point it can be set for any selection except C.
170	This indicates the <b>shift</b> in Hertz between the Mark and the Space.
H	<b>High</b> Tone Pairs (L=Low Tone Pairs)
N	This position refers to <b>sense</b> and will either be: N = Normal R = Reverse As will be discussed later, you will need to check most RTTY signals for Normal or Reverse sense.
ATC	<b>Automatic Threshold Control</b> indication. Should be visible (ON). Discussed later.
AGC	<b>Automatic Gain Control</b> indication. Should be visible (ON). Discussed later.
UOS	<b>Upshift On Space</b> indication. Should be visible (ON). Discussed later.
NOR	<b>Keyboard Status</b> indication. Should indicate NOR for normal. See next chapter on Keypads
19:05	Current <b>time</b> indication (24 hour format).

## 6.0 THE KEYBOARDS

The two keyboards are used to control nearly every aspect of the M-7000's operation. Because of the many functions of the M-7000, two keyboards are required and are identified as the left keyboard and right keyboards.

Even with two keyboards, there are still not enough keys to support all functions. Therefore, the keypads have two levels of operation called ALTERNATE and NORMAL. The left-most toggle switch selects whether the keyboards are in ALTERNATE or NORMAL mode. In most instances, we will want to keep this switch set down (NORMAL mode).



Left Keyboard

Keyboard Mode: Normal or Alternate Right Keyboard

BI Manual	Frame Left	Frame Right	ARQ-E3
	Auto Sync	Manual Sync	
BI Automatic	Bit/Char Up		
Split Screen	Bit/Char Down		ARQ-E
Databit Display	Literal Display	Program	Help

LEFT KEYBOARD

1	2	3	Mark Freq.
4	5	6	Space Freq.
7	8	9	Shift
	0	Baud	

RIGHT KEYBOARD

ALTERNATE

SRO Line/Gray	Status Print	Screen Print	CW
Speed Up	Scroll Up	UOS/PAR IOC	SITOR
Speed Down	Scroll Down	Case Change Direction	ARQ-M
ASCII	Screen Clear	BAUDOT	PACKET

NORMAL

NOR/REV POS/NEG	Filter Tune	Start Stop	Memory Select
Shift Up	VFT Group	ATC	ARQ Channel
Shift Down	Shift	Input Select	Auto Tune
Alphabet	Demod. Mode	AGC	FAX

## 7.0 THE TOGGLES

The M-7000 has six toggle switches on the front. Three are to the left of the GAIN knob, and three to the right. During our learning session we will leave all six switches fixed in the following positions: — —



In every-day operation of the M-7000 you will likely keep these switches positioned as shown. Their functions are fully described in the Owner's Manual.

Reminder: It is especially important to **leave** the MO/MS/SO toggle switch in the center position.

## 8.0 MORSE CODE

Morse code was the first radio transmission mode. It still remains a popular form of text transmission on shortwave today. Morse (also called CW) is in wide use by maritime coastal stations, ships at sea and amateur radio operators.

To ready your M-7000 for Morse reception, press the [C] on the left keyboard. We will refer to this key as [LCn]



The L stands for the left keyboard, the C stands for the C key, and the lower case n stands for normal keyboard use. For beginning purposes, we will always leave the first toggle switch down in the Keyboard Normal position.

The status line should now indicate:

```

--TUNE--> 1 MORSE MED 1000      AGC      NOR 19:05
  
```

The last four digits indicate time and will thus be changing every minute. We will indicate it in this manual as 00:00 for the sake of simplicity. Subsequent presses of the [LCn] key will take you to MORSE FAST, MORSE SLOW and back to MORSE MED. In nearly every case MORSE MED is the best setting (MED means medium speed).



Find a Morse code station that is strong and without interference. The best sent Morse code can be found in the international maritime bands. Coastal station code operators send high quality code. Try some of these frequencies:

DAYS	EVENINGS
12655 - 13070 KHz.	6325 - 6490 KHz.
16860 - 17195 KHz.	8435 - 8700 KHz.
22315 - 22555 KHz.	12655 - 13070 KHz.

When tuning Morse code, look at the red "CW" LED indicator only! It should flicker in perfect unison with the signal. Tune for maximum brightness of this indicator and maximum deflection of the TUNE FOR MAX bar graph. Please be careful not to overdrive the M-7000. It is important that the "CW" LED also flicks off between code elements (dits and dahs). Turn down the M-7000 GAIN control if necessary to insure this.

Morse code transmissions may seem at first baffling to the radio listener. Morse code operators use many abbreviations. A typical CW maritime transmission may look like:

CQ CQ CQ DE WCC WCC WCC QSX 6 8 12 MHZ  
CHNL 5/6/11 RTTY SITOR 1.0 AMVER OBS? K

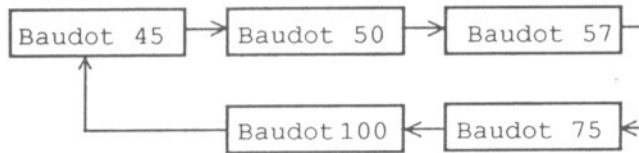
In "English" this means: Calling all stations. This is coastal station WCC. I am listening on 6, 8 and 12 MHz. and channels 5, 6 and 11 in Sitor radioteletype. I await your Automated Mutual Assistance Vessel Rescue System observations. End.

## 9.0 BAUDOT RTTY

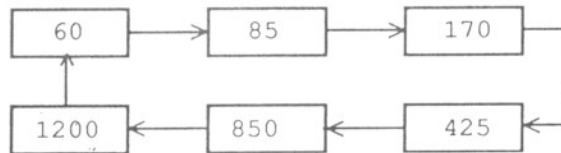
The oldest and still most popular form of RTTY on shortwave today is Baudot (pronounced Baw-Dough). In Baudot each transmitted character is composed of a total of 5 bits. Each bit can be either a Mark or a Space. The M-7000 has an audio detection filter for both Marks and Spaces. It will be our job to align these audio Marks and Spaces to the M-7000. To prepare the M-7000 for Baudot RTTY reception, press the [B] on the left keyboard [LBn]. The status line should now read:

```
--TUNE--> D1 BAUDOT 45 | 170 H N ATC AGC UOS          NOR 00:00
```

Let's practice changing some of the elements of the status line. To change the Baudot speed (baud rate) press [LBn] again. Subsequent presses of this key will step you through the standard Baudot speed as shown below. Try this and observe the status line.



Another important parameter we need to control is the shift. The shift is the frequency difference between the Mark and the Space. Most stations transmit with their Mark and Space separated by a standard shift of 170, 425 or 850 Hz. The M-7000 has these standard shifts built in plus a few extras. It can even do "variable shift" (see Owner's Manual). To select the various standard shifts, press the [8] key on the right keypad [R8n] several times and watch the shift change on the status line.



The other status line element that we must learn to control is the Normal-Reverse Sense function. Some RTTY stations send their text "Normal" and others "Reverse". Additionally, how you are tuned on the signal impacts whether you will obtain copy as Normal or Reverse. For now, just understand that you must try it both ways when you encounter a Baudot RTTY station. To go from Normal to Reverse sense press the [1] button on the right keyboard [R1n]. Watch the status line from a Normal to Reverse indication. Try it now.

Leave the following options as they are (ON):

ATC	Controlled by [R6n]
AGC	Controlled by [RBn]
UOS	Controlled by [L6n]

We are now ready to tune a Baudot RTTY station. As a beginner, it would be advisable to seek a known RTTY station rather than to start randomly tuning around the bands. If you start blindly tuning RTTY stations it is likely that you will encounter mostly unreadable signals. These signals will produce characters on your video screen but they will likely be "garbage", or at least appear to be garbage. Regardless of what audio signal you feed into the M-7000, it will **try** to decode it. If it is not a valid RTTY signal, or if any of your M-7000 settings are incorrect, you will not obtain readable copy. Also keep in mind that the considerable Arabic and Russian RTTY traffic may also appear as "garbage" at least until you become more knowledgeable in these areas.

So our first job is to try to find a published RTTY station that we know is transmitting readable RTTY. The table below will list some stations to try for. You certainly will not be able to hear them all. At least not all at once. A published RTTY station may not be receivable for several reasons:

- Many frequencies are seasonal and only in use during certain months.
- Most RTTY stations transmit in a directional pattern, and therefore may not be audible in your area.
- Propagation may not permit reception at a given time.
- Like other shortwave stations, RTTY stations do change frequencies at will to avoid interference or to improve their signal coverage.
- Some stations only transmit on certain days, many with reduced weekend schedules.

*Reminder ...*

When looking for a specific RTTY station, always try the listed frequency plus or minus 3 KHz. The station may not appear exactly on your receiver's digital readout as it is published.

TIME (GMT)	KHz.	Baud	Shift	Station
0000	7442	75	425	USIA press also 12223
0000	10972	75	425	USIA press also 13995
0000-0200	11012	75	850	DYN Spanish press
0400-0415	11478	50	425	KCNA English press
0500	16135	75	425	APN press
0700	9187	50	425	AFP French press
0800	8140	50	425	PL press
1300	9145	50	425	TASS press also 10270
1400	13648	50	425	CTK English press
1400	7695	50	850	CNA press also 9090
1400	5097	50	425	JIFI press also 8175
1400	7560	50	425	TASS press also 8030,9145
1400-1900	14901	50	425	TASS (Strong days!!!)
1400	10270	50	425	TASS Press also 16348
1500	5195	50	425	ADN press
1500	9051	50	425	ANSA English press
1500-	9430	50	425	ATA English press
1500-	16136	50	300	TASS English Press
1500	7800	50	425	IRNA English press
1500	9395	50	425	KCNA press also 10580
1500	9331	50	425	VNA press also 10599
1600	15925	50	425	TASS English Press
1600	10920	50	425	ADN press also 11123
1600	14637	75	425	USIA press also 18215
1700	10920	50	425	ADN press
1800	8020	50	425	KCNA press
2000	18542	75	425	USIA press also 14637
2100	11150	75	425	USIA press also 18215
2300	13995	75	425	USIA press
	10535	75	850	CFH Weather (also FAX)
	13510	75	850	CFH Weather (also FAX)
	14356	50	425	GFL24 Weather

Now that you have found a good signal from the previous list, let us check the receiver settings. Your shortwave receiver should be set in the RTTY mode. If your receiver does not have a RTTY mode, select LSB or CW. Your selectivity should be set for a value between 1.5 and 3.0 KHz. Filter selectivity below 1.5 may be too narrow for RTTY signals with an 850 Hz shift.

Check the M-7000 status line. It should say BAUDOT followed by the correct speed (baud rate). Press the [LBn] key until you select the correct rate. Press the [R8n] until you select the correct shift. Now slowly adjust the tuning (or BFO) of your receiver until you are able to light the MK and the SP LEDs on the M-7000. The object is to illuminate these two LEDs equally and obtain maximum rightward deflection of the TUNE FOR MAX bargraph. Do not concern yourself with the other LEDs ... just watch the MK and the SP LEDs.

With the MK and SP LEDs flashing, you are now tuned to the signal. You may wish to fine tune your AUDIO INPUT LEVEL by rotating the GAIN control until it deflects in the orange area.

Look at the screen. If the text is still not readable, you should try to change the "Sense" from Normal to Reverse. Press the [R1n] key to try both normal and reverse. Readable print should follow.

By now you should be able to tune a regular Baudot RTTY station. Before moving on to yet another mode let us look at a few more M-7000 features. You will first need to tune to a readable Baudot.

### **SPEED READOUT (SRO) [L1n]**

Pressing the [1] key on the left keyboard will initiate the M-7000's special speed-readout function. This feature measures the speed of the incoming RTTY signal and displays it to the status line:

```
---TUNE--> D1 BAUDOT 45 I 170 H N ATC AGC UOS      BAUD =      NOR 00:00
```

On a weak signal it might be advisable to press this button more than once to get the correct reading. The speed indicated will often vary by one or baud. For example, a 50 baud signal may yield a reading of 51 baud. The readout may be erratic on weak or non-standard signals.

### **FILTER TUNE [R2n]**

We learned earlier that it is vital to tune both the Mark and Space tones. On a published station (where the "shift" is known) it is usually desirable to set the proper shift and then manually tune your receiver to the mark and space.

However, there may be times when this proves difficult. The M-7000 does have the ability to automatically tune the mark and space filters. To try this feature, simply tune the station the best you can (perhaps at least tuning the Mark tone). Then press [R2n]. The M-7000 will try to tune the signal and calculate the shift. Watch the status line. It will indicate one of the following conditions:

TUNE	The M-7000 is in the process of trying to tune.
TUNED	The M-7000 has tuned the station.
TONES LOW	You must tune your receiver to produce higher tones. Then retry.
TONES HIGH	You must tune your receiver to produce lower tones. Then retry.
CAN'T TUNE	This indicates that the station has a shift too narrow to tune. This will also occur if the station is currently sending <b>only</b> a mark or <b>only</b> a space. Retry and/or retune.

**AUTO TUNE** [REn]

This process essentially combines the Speed Readout function with the Auto Tune feature.

The M-7000 first performs the filter tuning function. It will automatically retry this filter tuning before indicating "CAN'T TUNE". After the mark and space have been successfully tuned, the unit goes directly to the auto baud function. This is similar to the Speed-Readout function, but goes one step further. Not only does the M-7000 display the baud rate, but also sets itself to that baud rate. Finally, the M-7000 will attempt to determine whether the signal sense is Normal or Reverse and set itself accordingly.

It is important to note that all three of these automated features are very susceptible to falsing by noise, fading and distortion. Auto Tune should not be attempted on weak or fading signals. It is also our recommendation that manual tuning be considered as the first choice.

**SCROLL DOWN** [L8n]

The M-7000 scrolls text from the bottom line up. There may be occasions where you may wish to review lines that have already scrolled up and off the screen. To do this, simply press and hold [L8n].

**SCROLL UP** [L5n]

Press [L5n] to scroll back down to the last line. If you are already displaying this line, the [L5n] button will have no effect.

**SCREEN CLEAR** [L0n]

If you wish to clear the screen press [L0n]. This will also clear the print buffer (see Owner's Manual).

## 10.0 SITOR A

Sitor A is an increasingly important and popular mode on shortwave. It is clearly becoming the mode of choice by maritime concerns, and is seeing growing use by diplomatic and embassy users.

Sitor A (also known as ARQTOR, SPECTOR and AMTOR Mode A) is one of the easiest RTTY modes to find and tune. It is easy to find because of its unique *chirp, chirp, chirp* sound. It is easy to tune because the baud rate is fixed at 100, the shift usually at 170, and the M-7000 automatically determines the correct "sense" (that is, Normal or Reverse).

To select Sitor A press [LDn]. Then press [RBn] until the AGC indication on the status line goes off:

```

--TUNE--> D1 SITORA 100 T 170 H ATC   UOS           NOR 19:05
  
```

Subsequent presses of the [LDn] will step you through the other Sitor modes as well. (To be discussed shortly).

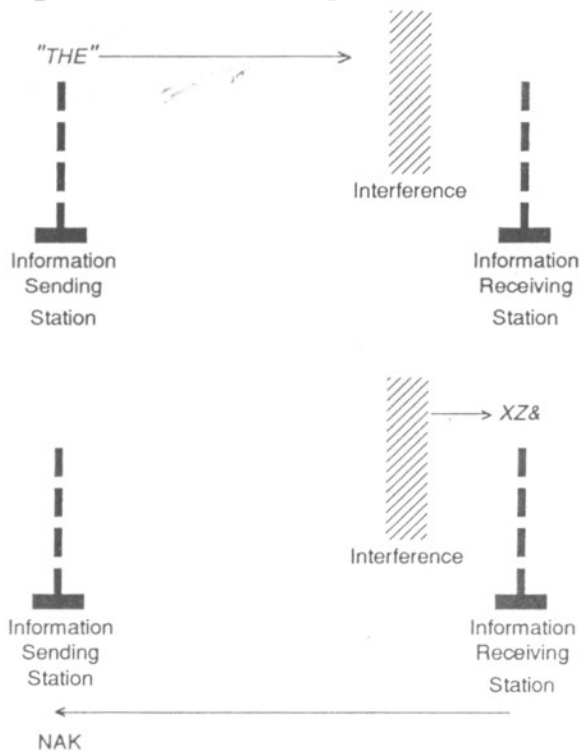


Leaving your M-7000 in the SITORA mode, try to find a Sitor A station. Using the frequency chart below, listen for the distinctive *chirp, chirp* sound. Once again, the idea will be to tune the radio receiver in such a manner as to get both the MK and SP LEDs to flicker on the M-7000. Don't worry about all the other LEDs for the moment! Now that you have both Mark and Space you may or may not be getting text on your screen. Let's take a moment to discuss the theory of SITOR communications.

DAYS	EVENINGS
12465 - 13070 KHz.	6325 - 6490 KHz.
16860 - 17225 KHz.	8435 - 8700 KHz.
22315 - 22555 KHz.	12465 - 13070 KHz.

## SITOR A THEORY

In Sitor A you have at any given moment a transmitting station and a receiving station. The master or calling station establishes the contact and then sends the first three characters of the transmission to the receiving station (in our example the word "THE".)



Because of the interference, the transmission was garbled. Therefore, the Information Receiving Station (operating on a different frequency) sends back a **negative** acknowledgement (NAK) to the sending station. This automatically forces the sending station to retransmit the three characters.



This time the transmission group was properly received. The Receiving station then sends back an acknowledgement (ACK). This signifies that the last 3 character group was received properly, and the next 3 character group should be sent.

When you tune to a Sitor A station, the chirps you hear may be the three character groups being sent, or they may be nothing more than the acknowledgement pulses from the receiving station. (Or in "computer" terms ... you may be merely listening to the "handshaking"). The sound is quite similar. However, in time you will be able to tell the difference by "ear". Until then, be patient. Understand that when the receiving station is done receiving he will probably start transmitting text back to the original transmitting station.

## 11.0 SITOR B

Sitor B (FEC) is another popular mode with built-in error correction capability. It does not have nearly as distinctive a sound as does Sitor Mode A. Rather, it sounds just a bit "faster" than regular 75 baud Baudot, and has more "singing" sound to it.

Sitor B is generally used as a broadcast mode. Sitor A, as you recall, was a mode basically used between two stations. Sitor B is commonly used by coastal maritime stations to transmit messages (weather, press, traffic lists etc.) to a group of ships.

To select Sitor B press [LDn]. Then press [RBn] until the AGC indication on the status line goes off:

```
---TUNE--> D1 SITORB 100 T 170 H ATC UOS NOR 19:05
```

A key advantage to Sitor B over regular Baudot RTTY is its built in error correcting capability. Each character is actually sent twice with four characters occurring between the first and second transmission of a character. Not only is each character sent twice, but special error correcting tests are done on each character received. You will not see each character twice however, as the M-7000 will filter out the redundant characters. (Unless you are in the LITERAL mode ... see Owner's Manual).

There are actually two Mode B formats - Collective and Selective. You need not be too concerned with this, as the M-7000 will automatically select the correct format.

Collective Mode B is the most common form. In this mode the special phasing signal is sent at the beginning of the transmission and at the end of each line. Therefore, it may take the M-7000 several seconds to lock on (sync) to the Mode B collective signal.

In the less common Selective Mode B, the phasing signal is sent ONLY at the beginning of the transmission. Therefore, if you miss the initial sync pulse, you will not be able to copy the message.

When you request a Speed Readout on a maritime frequency, and the result is BAUD = 100, this usually indicates a Sitor B station.

Here are some frequencies to try:

DAYS	EVENINGS
13070 - 13100 KHz.	4350 - 4360 KHz.
17195 - 17210 KHz.	8035 - 8055 KHz.
20930 - 20940 KHz.	8710 - 8720 KHz.
22575 - 22595 KHz.	13070 - 13100 KHz.

Watch for diplomatic Sitor B on: 9117, 11423, 11494, 13602, 13791, 14362, 15647 and 18993 KHz.

## 12.0 ASCII

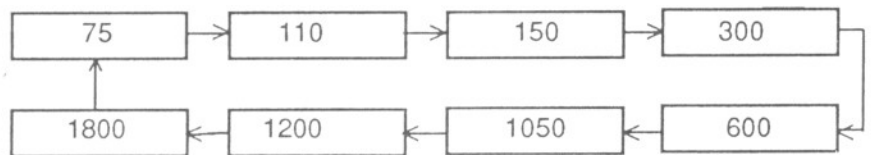
While ASCII is a very common communications format in the computer world, it is **very** rare on shortwave radio. As a new RTTY listener, your best bet is to simply forget about ASCII for now.

However, if your curiosity gets the better of you, there is one station that does transmit ASCII regularly.

To select ASCII press [LAn]. There are several ASCII speeds available. Press [LAn] a second time to get to the required 110 baud. The status line should look something like:

```
--TUNE--> D1 ASCII 110 T 170 H ATC AGC NOR 19:05
```

Repeated presses of the [LAn] will take you through all the available standard ASCII speeds. 110 Baud is probably all you will ever need for shortwave work. The higher speeds can be found on VHF and satellite circuits.



The one station with regular ASCII transmissions is W1AW, the master station of the American Radio Relay League located in Newington, CT. They transmit bulletins daily for radio amateurs in the following modes:

· Baudot 45                    · ASCII 110                    · Sitor B 100

The W1AW teletype schedule:

DAILY	MONDAY - FRIDAY
0100, 0400, 2200 UTC	1500 UTC
Frequencies for all teleprinter transmissions: 3625, 7095, 14095, 21095 & 28095 KHz	

Other frequencies where ASCII 110 has occasionally been observed:

20610, 20876 KHz

## 13.0 Packet

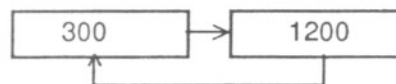
Packet is one of the newest modes on shortwave. It is becoming very popular with radio amateurs. The M-7000 receives both 300 and 1200 baud Packet (AX.25). Packet is a very efficient mode where the information to be transmitted is sent as a series of packets.

Be sure the M-7000 ATC and AGC features are turned OFF.

To select Packet press [LFn]. There are two Packet speeds available. Press [LFn] until you get 300 baud. The status line should look something like:

```
---TUNE--> D1 PAKET 300 1030 NOR 19:05
```

Repeated presses of the [LFn] will select either 300 or 1200 baud. Only 300 baud is used on shortwave. The 1200 baud setting is used for VHF work (most commonly on the 2 meter Ham band at 144.9 - 145.1 MHz).



Again, the tuning is the same. Slowly tune your shortwave receivers until you get both the MK and SP LEDs to flash. One of the challenges to tuning this mode is that the Packet transmissions can be very short. Many transmissions are only 1 or 2 seconds long. Therefore, it may take a bit of patience to get the hang of it. Eventually you will get more dexterous at this and develop an "ear" for what the Packet tones should sound like.

The best spot on shortwave is about 14090 KHz (+/- 20 KHz). It is especially active on weekend afternoons. Also try 7080 KHz (+/- 10 KHz). Packet has been noted outside the ham bands at 13994 and 14933 KHz (M.A.R.S. traffic).

Be advised that much Packet traffic is very cryptic in nature. Not only do you have to deal with radio abbreviations, but also computer abbreviations are heavily used. The screen will display the call sign of the sender, followed by the addressee, followed by the message.

## 14.0 Help Feature

Before we explore any more new modes let us look at a very handy M-7000 feature called HELP. To invoke this feature simply move the first toggle switch from the NORM position to the ALT position. Then press the [F] key on the left keyboard (that is: [LFa]).

- Move up to ALT
- Press [LFa]
- Move down to NORM



The HELP screen gives you a visual image of the keyboard functions. This feature can be called at any time except while in the FAX mode.

To turn the feature off and resume normal display, simply press [LFa] again. Then move the Keyboard toggle switch back down to the NORM position.

The HELP function does not stop reception of the signal into the video memory or out to the printer.

-----NORMAL-----							
1 SRO	2 STATUS	3 SCREEN	C MORSE	1 NORM	2 FILTER	3 START	C MEMORY
FORMAT	PRINT	PRINT		REV	TUNE	STOP	RECALL
4 SPEED	5 SCROLL	6 UOS/PAR	D SITOR	4 SHIFT	5 VFT	6 ATC	D ARQ
UP	UP	IOC		UP	GROUP		CHANNEL
7 SPEED	8 SCROLL	9 CASE	E ARQ	7 SHIFT	8 SHIFT	9 INPUT	E AUTO
DOWN	DOWN	DIR		DOWN		SELECT	TUNE
A ASCII	0 CLEAR	B BAUDOT	F PACKET	A ALPHA	0 DEMOD	B ACC	F FAX
				BET	MODE		
-----ALTERNATE-----							
1 BIT INV	2 FRAME	3 FRAME	C ARQ-E3	1	2	3	C MARK
MANUAL	LEFT	RIGHT					FREQ
4 BIT INV	5 BITS	6	D	4	5	6	D SPACE
AUTO	INCR						FREQ
7 SPLIT	8 BITS	9	E ARQ-E	7	8	9	E SHIFT
SCREEN	DECR						FREQ
A DATABIT	0 LITERAL	B PROG	F HELP	A	0	B BAUD	F
			SCREEN			RATE	
--TUNE--> D1 BAUDOT 45 I 170 H N ATC AGC UOS NOR 19:05							

## 15.0 Printer Hookup

There are still more RTTY modes on the M-7000, but we are going to skip them for a moment so we can explore the exciting world of facsimile reception. The M-7000 delivers a high resolution FAX image via the parallel printer port.

Now would be a good time to hook up our parallel printer. This printer will serve to print "hardcopy" on all our RTTY and Morse signals as well as our facsimile images. We have found that nearly all parallel printers will work for RTTY and Morse hardcopy. However, compatibility for facsimile printing is more particular. The parallel printer must have the Epson graphics set, and meet other special requirements. The table below shows printers that are known to be usable for RTTY and FAX. They have been tested by Universal and/or its customers. Other printers may indeed work, but Universal does not have the resources to test all printers on the market. Please see Chapter 24 for specific printer configurations.

CHART OF COMPATIBLE PRINTERS	
Epson LQ-2500 ❖	Seikosha SL-80AI ❖ ☆
Epson LQ-1000 ❖☆	Seikosha SP-180AI ☆
Epson LQ-850 ❖☆	Seikosha SP-1000A ☆
Epson LQ-800 ❖☆	NEC N5
Epson LQ-500	NEC N7
Epson FX-85 ☆	NEC P5
Epson FX-86e	NEC P5XL
Epson FX-185	NEC P6
Epson FX-286e	Okidata ML-92
Epson RX-80	
Epson RX-100	Diconix 150 ☆
Epson JX-80	Printer Plus NLQ
Epson LX-86	C.ltoh C-310-CXP
Panasonic 1595	IBM Proprinter 2
Honeywell NP-10	IBM PC Graphics Printer
Star NR-15 ❖☆	Sears SR-2000

❖ Optimum choice (24 pin print head)  
 ☆ Tested by Universal Shortwave

The following printers will not work for FAX: Radio Shack DMP-130, Gemini Star 10-X and all serial printers. Such printers may work for text modes (RTTY, CW, etc).

## 16.0 FAX

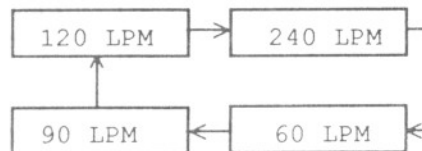
There are still more teletype modes on the M-7000, but we are going to skip them for a moment so we can explore the exciting world of facsimile reception. Facsimile, or FAX for short, is the transmission of photos, charts, maps and other documents over radio. To prepare the M-7000 for Facsimile reception, press the [F] on the right keyboard [RFn]. The status line should now indicate:

```
<W--+--B> D1 FAX FM 120 576 POS L-R AGC LINE NOR 19:05
```

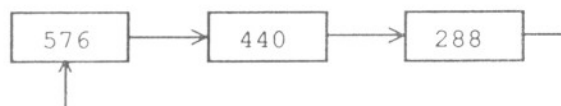
This is the most common setting for the reception of shortwave FAX. Nearly all weather maps are sent in the above format.

FM indicates frequency modulated FAX. This would include all shortwave FAX transmissions. Do not confuse the FM indication with the FM radio transmission mode. In FM FAX the transmission is modulated by a changing frequency tone. This is contrasted with AM FAX where the FAX is modulated by the loudness (amplitude) of the signal. (AM FAX is used only on satellite downlinks).

A FAX photo is transmitted by first scanning the original image. In most cases the image will be scanned at 120 lines per minute. It is important to set the M-7000 to receive the image at the same rate. To change the FAX speed press the [LFn] button as needed. The M-7000 receives all four standard speeds.



Another important parameter we need to control is the International Index of Cooperation or I.O.C. This term indicates the relationship between the width of the image and the number of lines per inch that make up the image. Nearly all weather maps are transmitted with an I.O.C. of 576. Press photos are transmitted with an I.O.C. of 288. Press the [L6n] key to change the I.O.C.



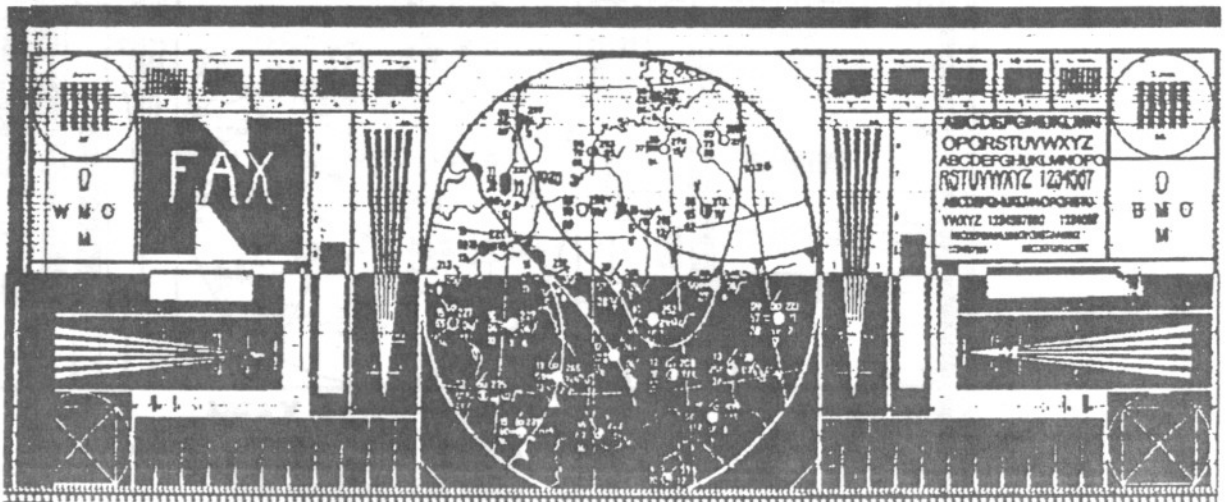
The M-7000 FAX examples that follow have been reduced to 78% of their original size to fit this manual. The FAX prints are courtesy of Stephen C. Boch, Universal Radio.

The versatile M-7000 gives you still further control of your FAX image.

**POSITIVE-NEGATIVE [R1n]**

This key permits you to change the polarity of the received image. For example, if the image starts to appear as a negative press this button once. Please note this is a relative indication. The status line will remind you of which polarity you are in with a "POS" or "NEG" indication.

The example below illustrates a FAX transmission printed properly as a positive for the first half of the image. Then the M-7000 was set to "NEG" to illustrate the negative function.



**LEFT-RIGHT RIGHT-LEFT [L9n]**

This key permits you to change the direction of the print being received. Some stations not only change the polarity of the transmitted image, but also the direction. This is especially true of press photos. If the image appears to be "backwards" press [L9n].

The example below illustrates a FAX transmission printed in the improper direction.

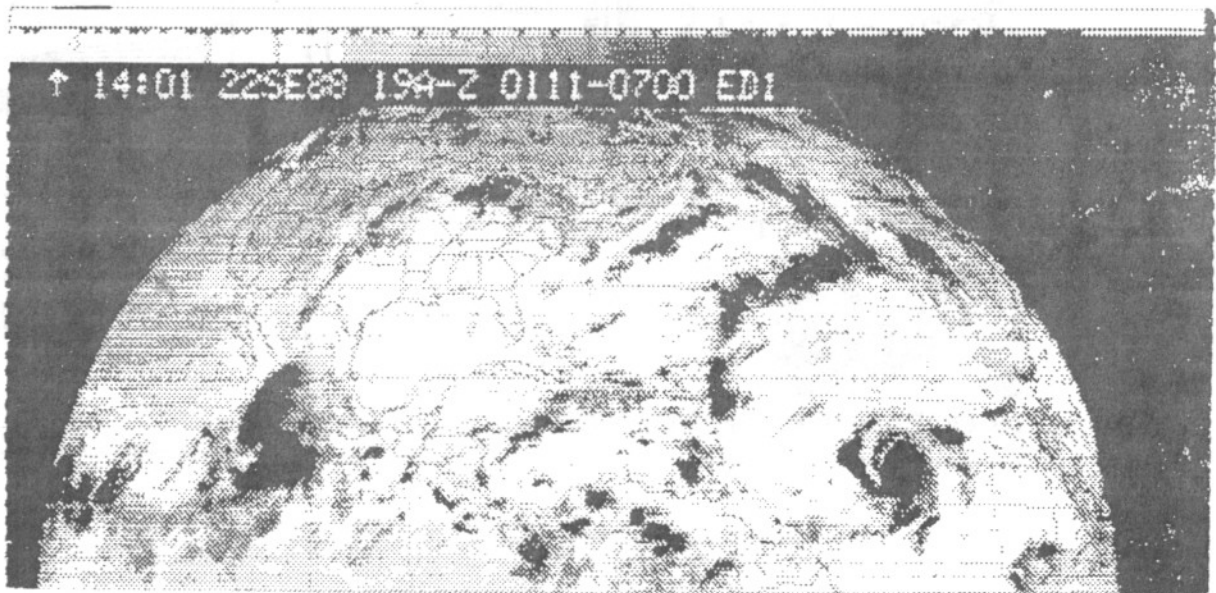
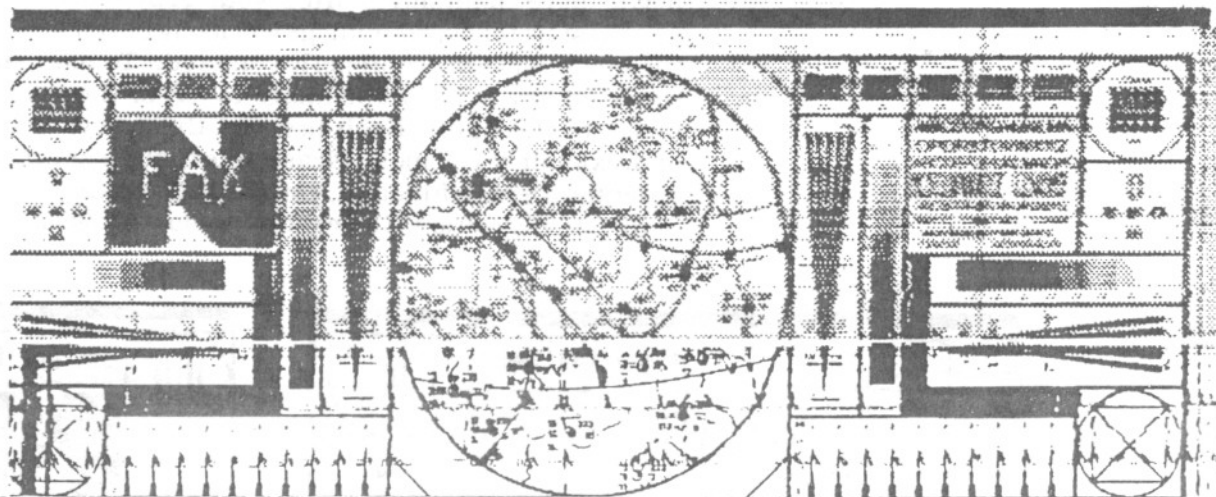


### LINE-MODE GRAY-MODE [Lin]

This key permits you to change the process by which your image is printed to your printer. For maximum resolution and clarity the LINE-mode should be selected. This is especially true for the reception of maps and charts.

On certain press photos, especially large portraits the GRAY-mode will give a softer more natural appearance. Also certain cloud photos seem more natural when printed in the gray mode. This and all other features may be changed "on the fly". This means you may change parameters during the reception of an image.

The first two thirds of the example below was copied in GRAY-mode and then changed to LINE-mode ("on-the-fly") for better clarity. Maps and charts should be copied in LINE-mode. Some press photos and satellite imagery however, often look more natural in GRAY-mode. See second example. (Notice tropical storm *Helene* in North Atlantic).



**MANUAL START [R3n]**

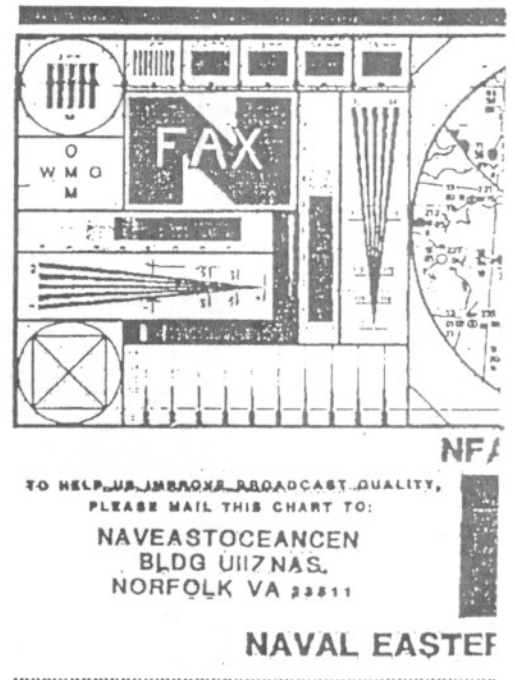
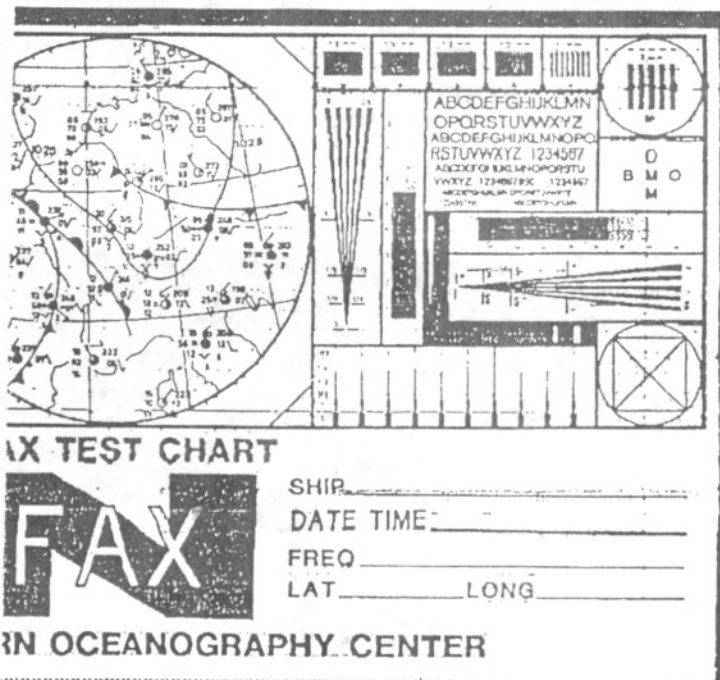
Each FAX image is preceded by special tones that tell the converter (M-7000) what speed and IOC to select. These tones also frame or sync the image.

If you come across a FAX signal you can still copy it manually, even if you have missed all the special tones. You must select the correct speed, IOC, and manually sync the image. Plus you must manually start the image out to the printer.

The manual start button is [R3n]. If you are properly tuned to the signal, pressing this button will start the FAX image.

**FRAME-LEFT FRAME-RIGHT [L2a] [L3a]**

If you have manually started your FAX reception or missed your special start tones, your image will likely be out of sync. That is to say, the image will not be properly centered. To manually frame it press the [L2a] key to move the image to left or the [L3a] key to move the image to the right. Each press of these keys will move the image approximately 1/2 inch. Please note that these are alternate keys. In order for them to function, you must press the first toggle switch up to the "ALT" position. The example below shows a mis-framed image.



Tuning FAX is not difficult, but does take some practice. Finding a FAX signal is not difficult because they have a distinctive scratchy sound to them. They sound like a phonograph record stuck on the end of a song. The table at the end of this chapter gives several frequencies to try (8080 or 10865 KHz is usually the strongest).

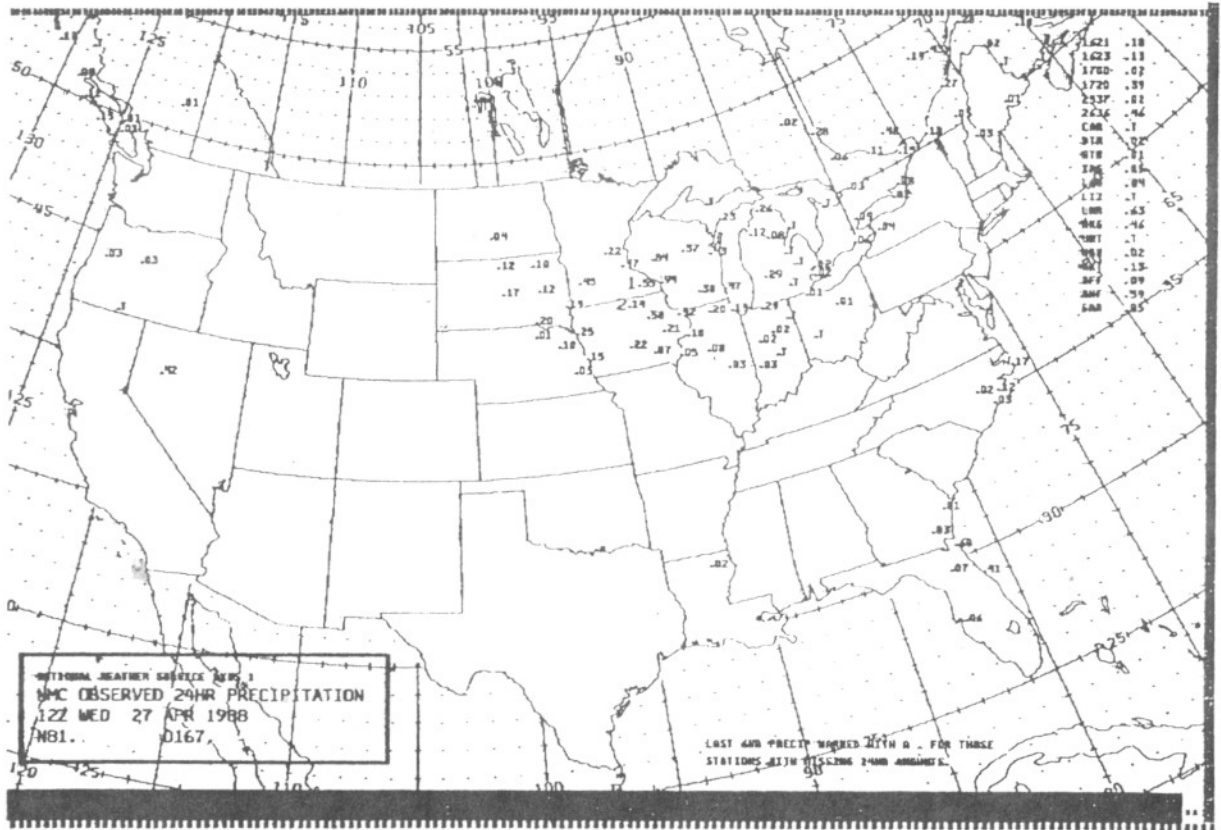
In order to activate the printer be sure the PRINTER (far right) toggle switch is either on AUTO or ON.

When the FAX mode is selected a special on screen indicator is displayed:

< W --+-- B >

The "W" and "B" correspond to the White and Black FAX image levels. For tuning most weather charts the indicator should be in the left one third of the scale. On press photos the indicator should swing to center.

When tuning FAX on shortwave (FM FAX), the MK and SP LEDs and TUNE FOR MAX should be used for proper tuning. On charts and maps the SP LED will be brighter. The SQL LED will light when the signal is correct for good FAX. The DATA LED will be on while the FAX is actually running. The example below shows a properly tuned FAX map.



## FACSIMILE FREQUENCIES

TIME (GMT)	KHz.	LPM	IOC	Station	
evenings	3357	120	576	NAM Norfolk, VA	WX
evenings	4296	120	576	NOJ Kodiak, AK	WX
evenings	4704	120	576	AOK Rota, Spain	WX
evenings	4853	120	576	NPM Pearl Harbor, HI	WX
	5768	120	576	JBK3 Tokyo, Japan	Press
	5878	60	288	-unknown-	Press
evenings	6330	120	576	CFH Halifax, NS	WX
evenings	6850	120	576	WLO Mobile, AL	WX
	6872	60	288	LRB79 B.Aires, Arg.	Press
evenings	6944	120	576	CKN Vancouver, BC	WX
	7993	120	576	NPM Pearl Harbor, HI	WX
	7710	120	576	VFF Frobisher Bay	WX
24 hours	8080	120	576	NAM Norfolk, VA	WX
evenings	8185	120	576	FPI88 Paris, France	WX
evenings	8459	120	576	NOJ Kodiak, AK	WX
	8467	60	576	Tokyo, Japan	Press
	8492	120	576	NPM Pearl Harbor, HI	WX
	8617	60	576	JJC Tokyo, Japan	Press
	8646	120	576	WWD LaJolla, CA	WX
	8682	120	576	NMC San Fran., CA	WX
	9157	120	576	WLO Mobile, AL	WX
	9383	120	576	NPN Apra, Guam	WX
	9395	120	576	NPM Pearl Harbor, HI	WX
	9438	120	576	JMJ3 Tokyo, Japan	WX
	10535	120	576	CFH Halifax, NS	WX
	10677	60	288	-unknown- (AP)	Press
24 hours	10863	120	576	NAM Norfolk, VA	WX
	12728	120	576	USN Point Reyes, CA	WX
	13454	60	288	Hong Kong (Reuters)	Press
	13751	120	576	London, England	Press
	14828	120	576	NPM Pearl Harbor, HI	WX
days	16410	120	576	NAM Norfolk, VA	WX
	17069	60	576	JJC Tokyo, Japan	Press
	17151	120	576	NMC San Fran., CA	WX
	17405	120	576	WWD LaJolla, CA	WX
	17585	120	576	AOK Rota, Spain	WX
late aft.	17670	60	288	LQZ67 B.Aires, Arg.	Press
	18093	120	576	LRO84 B.Aires, Arg.	WX
	18130	120	576	JMJ5 Tokyo, Japan	WX
	18413	60	288	-unknown- (Reuters)	Press
	18431	60	288	B.Aires, Arg. ( " )	Press
	20736	60	288	LSA600 B.Aires, Arg.	Press
	21037	120	576	NPM Pearl Harbor, HI	WX
	22542	120	576	Tokyo, Japan	Press

## 17.0 FDM (VFT)

One of the more unusual modes of teletype is Frequency Division Multiplex. This is not a mode for the beginner or the impatient! FDM signals can be spotted by their obnoxious droning sound, not unlike a buzz saw or a swarm of bees. To hear what it sounds like, place your receiver in USB and try 6995, 8032 or 10258 KHz. Select a receiver IF filter of 4 KHz. or more. Simply stated, the FDM signal is composed of several narrow shifted Baudot channels. Most FDM on shortwave is 16 channel. This is what we call mode B. To prepare the M-7000 for FDM reception, first select Baudot 50 [LBn]. Then press [R5n] twice. The status line should now indicate:

```
--TUNE--> D1 BAUDOT 50 I B 01 N ATC AGC UOS NOR 19:05
```

The [R8n] key will step you through the various channels (in this case 1 through 16). The various channels may be operating at different baud rates. One common format is 50 baud press on channel one, 75 baud weather on channels 2 and 3, with channels 4 to 16 encrypted.

To escape the VFT mode press [R0n]. Then press [R8n] as usual, to select the standard shifts.

Most listeners report best performance with their receivers set to LSB and a IF filter of 4 to 6 KHz selected.

### F.D.M. FREQUENCIES

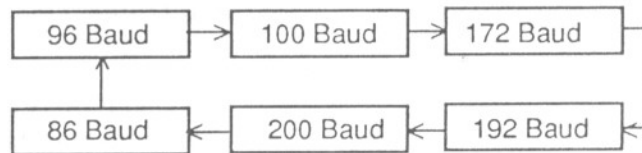
Mode	Ch.	KHz.	Baud	Service
B	01	2605	50	Press (AP-UPI)
B	09	4446	50	Press (AP-UPI)
B	09	4044	50	Press (AP-UPI)
B	01	6793	75	Press (AP-UPI)
B	01	6993	50	Press (AP-UPI)
B	02	6993	75	Aviation Weather
B	03	6993	75	Aviation Weather
B	03	7994	75	NLX RY test
B	01	8032	50	Press (AP-UPI)
B	02	8032	75	Aviation Weather
B	03	8032	75	Aviation Weather
B	02	10258	50	Press (AP-UPI)
B	03	10258	75	Aviation Weather
B	04	10258	75	Aviation Weather
B	01	14386	50	Press (AP-UPI)

## 18.0 ARQ Moore

ARQ Moore (aka as "Time Division Multiplex") is a technically different mode than the others we have reviewed. Once again, this is considered an advanced mode, and should not be attempted until other modes are mastered. Each signal consists of two channels (A & B). To hear what it sounds like, try one of the frequencies listed below. To prepare the M-7000 for ARQ Moore reception press [LEn] twice. This will take you to the most common setting of 96 baud. The status line should now indicate:

```
--TUNE--> D1 AR2 A 96 | 170 H ATC AGC UOS          NOR 19:05
```

The [LEn] key will step you through the various ARQ mode/speed combinations:



It is common for either or both channels to be inactive for hours at a time! The sound of the signal remains the same whether traffic is being sent or not.

It would be nice to have the M-7000 "watch" both channels automatically for you. To do this press [RDn]. The status line will now show an "AA" rather than an "A". This means the M-7000 is displaying A, but will automatically go to B if B is active while A is inactive. This would be the ideal way to monitor both channels.

Another way to watch both channels simultaneously is with the ARQ-M split screen function. To implement this press [L7a]. That is the 7 button with the left keyboard with keyboard toggle switch set up to "ALT". The top half of the screen will display channel A traffic, and the bottom half channel B traffic.

## ARQ MOORE FREQUENCIES

Mode	Baud	Shift	KHz.	Call	Location
AR2	96	850	5098	'RFTJ'	Dakar, Senegal (FN)
AR2	96	425	5160	CLN21	Bauta, Cuba
AR2	86	425	5219	VKD	Australia
AR2	96	425	5222	TYE	Cotonou, Benin
AR2	96	425	5730	5UA	Niamey, Niger
AR2	96	425	5807	XTU7	Ouagadougou, Bkino.Faso
AR2	86	850	5938	VLS	Sydney, Australia
AR2	96	850	6770	'RFLI'	Ft.of France, Mart.(FN)
AR2	96	425	6770	WKA46	New Orleans, USA
AR2	96	850	6883	FUX	Le Port, Reunion Is(FN)
AR2	96	850	6900	'RFTJ'	Dakar, Senegal (FN)
AR2	96	425	6941	TRK	Libreville, Gabon
AR2	96	425	7483	'RFTJ'	Dakar, Senegal (FN)
AR2	96	850	7605	'RFHI'	Noumea, New Caledonia
AR2	96	380	7922	5UA79	Niamey, Niger
AR2	96	425	7923	BZG41	Beijing, China (Xinhua)
AR2	96	425	8107	'RFQP'	Djibouti, Djibouti (FN)
AR2	96	850	9260	'HCS'	Ho Chi Minh, Vietnam
AR2	96	850	9980		Paris, France
AR2	96	850	10176		Paris, France
AR2	96	850	10520	'RFLI'	Ft.of France, Mart.(FN)
AR2	96	425	10813	'RFQP'	Djibouti, Djibouti (FN)
AR2	96	850	11108	'RFLI'	Ft.of France, Mart.(FN)
AR2	96	425	11445	CUA68	Lisbon, Portugal
AR2	96	425	11685	HVH	Vatican City
AR2	96	850	13592		Paris, France
AR2	96	425	13649		Paris, France
AR2	96	325	13678	MSS	Belize (RN)
AR2	96	850	13928		Buenos Aires, Argentina
AR2	96	850	14625	'RFLI'	Ft.of France, Mart.(FN)
AR2	96	850	14925	'RFTJ'	Dakar, Senegal (FN)
AR2	96	425	15696	CLN484	Havana, Cuba
AR2	96	850	15960	'RFLI'	Ft.of France, Mart.(FN)
AR2	96	850	16142	'RFLI'	Ft.of France, Mart.(FN)
AR2	96	170	17382	'KMS'	Karachi, Pakistan
AR2	96	425	18295	SDN10	Stockholm, Sweden
AR2	96	850	18520	'HOS'	Ho Chi Minh, Vietnam
AR2	96	850	18933	'HOS'	Ho Chi Minh, Vietnam
AR2	96	850	19100	'RFLI'	Ft.of France, Mart.(FN)
AR2	96	850	19203	'RFLI'	Ft.of France, Mart.(FN)
AR2	96	360	19576	ORI49	Brussels, Belgium
AR2	96	360	19679	7OB93	Aden, Yemen
AR2	96	850	23715	'RFLI'	Ft.of France, Mart.(FN)
AR2	96	850	24870	'RFHJ'	Papeete, Tahiti (FN)

## 19.0 ARQ-E

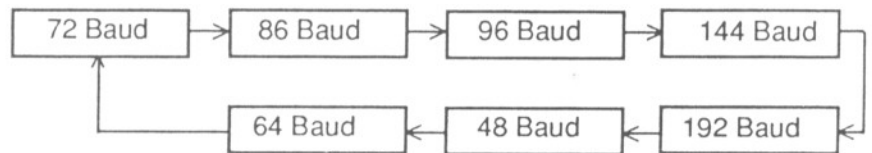
ARQ-E is a relatively new mode. It is a synchronous, single-channel, full-duplex mode. To synchronize the signal, one would follow the same procedures as for ARQ-Moore. Once again, this is considered an advanced mode, and should not be attempted until other modes are mastered. To prepare the M-7000 for ARQ-E reception press [LEa]. Please note that this is an "alternate" keypad function. This will take you to the most common setting of 72 baud. The status line should now indicate:

```

--TUNE--> D1 ARQ-E 96 I 170 H ATC AGC UOS
ALT 19:05

```

The [LEa] key will step you through the various ARQ-E speed combinations:



The [L4n] and [L7n] keys may be used to select variable non-standard speeds from 30 to 250 baud. However, such non-standard speeds have not been reported to date.

It is common for ARQ-E channels to be inactive (idle) for hours at a time! During these idle periods, the signal will have the familiar 'sing' sound to it. During the actual transmission of traffic the signal will sound very much like regular Baudot.

### ARQ-E FREQUENCIES

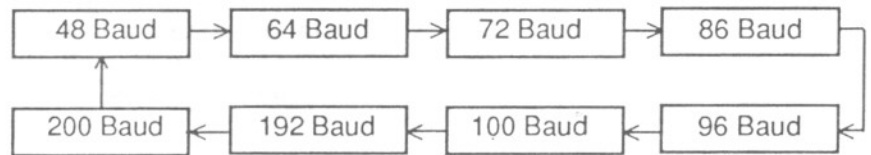
Mode	Baud	Shift	KHz.	Call	Location
ARQ-E	96	330	5357		Lyon, France
ARQ-E	72	400	9337		Bangui, Cent.Afr.Rep.
ARQ-E	72	390	10120	'RFFX'	Versailles, France
ARQ-E	72	850	10169	'RFTJD'	Libreville, Gabon (FN)
ARQ-E	72	425	10415		Beirut, Lebanon
ARQ-E	72	425	10665	'RFTJD'	Libreville, Gabon (FN)
ARQ-E	72	425	10858	'RFFX'	Versailles, France
ARQ-E	72	850	12063	'RFLIG'	Cayenne, French Guiana
ARQ-E	72	850	13732	'RFLIC'	(French TFC)
ARQ-E	72	425	13980		Beirut, Lebanon
ARQ-E	48	120	14663	DMK	Bonn, W.Germany
ARQ-E	72	425	14666		Port Bouet, Ivory Coast
ARQ-E	72	425	14960		
ARQ-E	72	425	15860	TLO	Bangui, Cent.Afr.Rep.
ARQ-E	96	170	18289	DMK	Bonn, W.Germany
ARQ-E	72	390	20268	TLO	Bangui, Cent.Afr.Rep.
ARQ-E	96	120	22905	DMK	Bonn, W.Germany

## 20.0 ARQ-E3

ARQ-E3 is a synchronous, single channel, full duplex transmission mode using seven-bit error detecting ITA-3 (Moore) code. Operation is very similar to ARQ-Moore modes described earlier. The M-7000 will automatically adjust for either 4 or 8 character repetition cycles. Once again, this is considered an advanced mode, and should not be attempted until other modes are mastered. To prepare the M-7000 for ARQ-E3 reception press [LCa]. Please note that this is an "alternate" keypad function. This will take you to the most common setting of 48 baud. The status line should now indicate:

```
--TUNE--> D1 ARQ-E3 96 I 170 H ATC AGC UOS                ALT 19:05
```

The [LCa] key will step you through the various ARQ-E3 speed combinations:



The [L4n] and [L7n] keys may be used to select variable non-standard speeds from 30 to 250 baud. However, such non-standard speeds have not been reported to date.

It is common for ARQ-E3 channels to be inactive (idle) for hours at a time!

### ARQ-E3 FREQUENCIES

Mode	Baud	Shift	KHz.	Call	Location
ARQ-E3	48	850	4056	TJK	Douala, Cameroon
ARQ-E3	48	425	10283	'RFLI'	Ft.of France, Mart.
ARQ-E3	48	850	10800	'RFLI'	Ft.of France, Mart.
ARQ-E3	48	850	13542	'RFTJD'	Libreville, Gabon
ARQ-E3	48	850	13683		Paris, France
ARQ-E3	48	850	14484		
ARQ-E3	48	850	14925	'RFTJ'	Dakar, Senegal
ARQ-E3	48	850	16260	'RFTJD'	Libreville, Gabon
ARQ-E3	96	425	17379	'RFTJ'	Dakar, Senegal
ARQ-E3	96	425	19048		Paris, France
ARQ-E3	48	840	20715		Paris, France
ARQ-E3	48	850	20812	'RFTJD'	Libreville, Gabon

## 21.0 Literal Mode

Literal mode is not really a transmission mode. Rather, it is an M-7000 display feature. It is suggested for advanced listeners only. Many transmitted characters do not normally print. Such characters would include linefeeds, carriage returns, blanks, BEL, WRU etc. For everyday RTTY listening, the display of these characters would be an annoyance. The studious listener may wish to see these characters to better understand the transmission mode, and perhaps even as an aid to identifying the signal. To place the M-7000 in the Literal mode press [LOa]. (Note: this is an "alternate" function). The mode of reception will remain, but LITERAL will appear on the status line.

```
--TUNE--> D1 BAUDOT 45 I 170 H ATC AGC LITERAL NOR 19:05
```

The UOS feature is automatically disabled. Try this mode on a known Baudot signal and study the symbols display. Press [LOa] again to turn this function off. Refer to the Owner's Manual for an explanation of these symbols.

## 22.0 Databit Mode

Databit is yet another M-7000 display feature. It goes one step "deeper" into the display of the transmitted text. It is an advanced code analysis mode for the seasoned data investigator. It is suggested strictly for advanced listener with data protocol experience. The Databit mode displays the transmitted text at its most rudimentary level, zeros and ones. To place the M-7000 in the Literal mode press [LAa]. (Note: this is an "alternate" function). The mode of reception will remain, but LITERAL will appear on the status line along with other special indications. The screen will rapidly fill with zeros and ones if you are receiving a RTTY signal.

```
--TUNE--> D1 ASYNC 100 850 H ATC AGC DATABIT 5 BIT NOR 19:05
```

Refer to the Owner's Manual for a further explanation of this feature.

## 23.0 System Programming

As a new M-7000 user, you may initially ignore the Programming operations. The M-7000 comes from the factory programmed for "normal" use. As you gain confidence with the device, you may desire to tailor some of its features to your own requirements. You may decide that you don't like the beeper feature, and wish to turn it off. Perhaps you wish to invoke special features such as the video squelch or screen saver functions. You may wish to enjoy the convenience of storing several commonly used mode settings into the M-7000 memories. To place the M-7000 in the Program mode press [LBa]. (Note: this is an "alternate" function).

-PROGRAMMING- D1 BAUDOT 45 I 170 H ATC AGC

NOR 19:05

The on-screen tuning indicator will be replaced with PROGRAMMING. The main programming menu will appear.

### MAIN MENU

- 1 SYSTEM
- 2 VIDEO
- 3 PRINTERS
- 4 CLOCK
- 5 BEEPER
- 6 SEL-CAL
- 7 MEMORIES
- 8 CALIBRATE
- D DIAGNOSTICS

E EXIT

Please refer to the Owner's Manual for a complete explanation of Programming Operations.

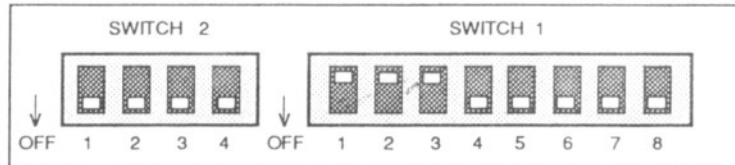
## 24.0 Printer Configurations

This section will provide detailed instructions on configuring a few typical printers for use with the M-7000. These examples will prove useful even if you do not have the exact model shown.

Positions marked with a ☆ are particularly significant to the operation of the M-7000.

Mfg.: **Seikosha**  
 Model: **SP-180AI**  
 Type: **9 Pin Dot Matrix**

Printer DIP Switch Settings:



Switch Functions:

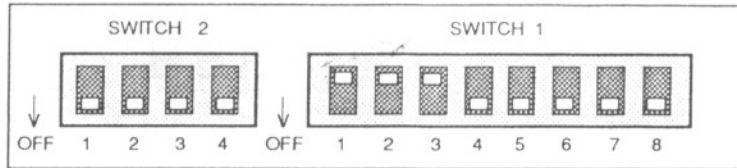
SW#	Function	Set	
2-1	1" Skip perforation	OFF	☆
2-2	Print Mode -	OFF	
2-3	Print Mode -	OFF	
2-4	Not Used	OFF	
1-1	Intl. Character	ON	
1-2	Intl. Character	ON	
1-3	Intl. Character	ON	
1-4	Page Length on=12" off=11"	OFF	
1-5	Mode on=IBM off=Standard	OFF	☆
1-6	If IBM, sel.1,2 or Download	OFF	
1-7	CR= on=CR+LF off=AUTOFEED	OFF	☆
1-8	Slashed Zero on=yes off=no	OFF	

M-7000 Printer Menu:

- 1 PRINTER SQUELCH = OFF
- 2 PRINTER M.S.I. = OFF
- 3 AUTO - STATUS = OFF
- 4 AUTO FORM FEED = OFF
- 5 SERIAL MODE = ASCII
- 6 SERIAL BAUDS = 110
- 7 SERIAL BIT 7 = ON
- 8 SERIAL ACR-LF = OFF
- 9 PARALLEL BIT 7 = OFF
- 0 PARALLEL ACR-LF = OFF
- A PARALLEL 24 PIN = OFF
- B WIDE CARRIAGE = OFF

Mfg.: **Seikosha**  
 Model: **SP-1000A**  
 Type: 9 Pin Dot Matrix

Printer DIP Switch Settings:



Switch Functions:

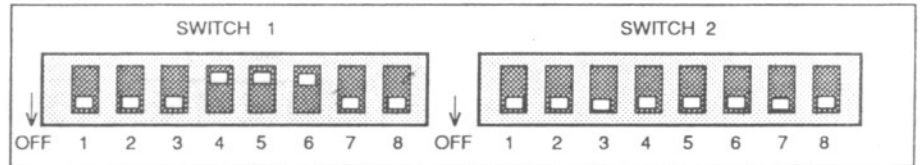
SW#	Function	Set
2-1	Italics on=on off=off	OFF
2-2	Print Mode -	OFF
2-3	Print Mode -	OFF
2-4	1.5K RAM on=download	OFF
1-1	Intl. Character USA=on	ON
1-2	Intl. Character USA=on	ON
1-3	Intl. Character USA=on	ON
1-4	Paper Detect on=on	ON
1-5	Slashed Zero on=yes off=no	OFF
1-6	Page Length on=12" off=11"	OFF
1-7	CR= on=CR+LF off=AUTOFEED	OFF ☆
1-8	Skip 1" Perf on=on off=off	OFF ☆

M-7000 Printer Menu:

- 1 PRINTER SQUELCH = OFF
- 2 PRINTER M.S.I. = OFF
- 3 AUTO - STATUS = OFF
- 4 AUTO FORM FEED = OFF
- 5 SERIAL MODE = ASCII
- 6 SERIAL BAUDS = 110
- 7 SERIAL BIT 7 = ON
- 8 SERIAL ACR-LF = OFF
- 9 PARALLEL BIT 7 = OFF
- 0 PARALLEL ACR-LF = OFF
- A PARALLEL 24 PIN = OFF
- B WIDE CARRIAGE = OFF

Mfg.: **Seikosha**  
 Model: **SL-80AI**  
 Type: **24 Pin Dot Matrix**

Printer DIP Switch Settings:



Switch Functions:

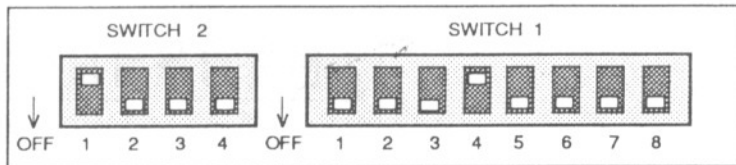
SW#	Function	Set
1-1	Not Used	OFF
1-2	Mode on=Standard off=IBM	OFF
1-3	Reserved	OFF
1-4	Intl. Characters -	ON
1-5	Intl. Characters -	ON
1-6	Intl. Characters -	ON
1-7	CR on=CR+LF off=Autofeed	OFF ☆
1-8	If IBM, sel.1,2 or Download	OFF ☆
2-1	CSF mode select on=selected	OFF
2-2	Paper Detect off=valid	OFF
2-3	Page Length on=12" off=11"	OFF
2-4	Skip Perf on=on off=off	OFF ☆
2-5	Print Mode on=draft off=LQ	OFF
2-6	Slashed Zero off=no on=yes	OFF
2-7	CR IBM Mode on=CR+LF off=CR	OFF ☆
2-8	Not used.	OFF

M-7000 Printer Menu:

- 1 PRINTER SQUELCH = OFF
- 2 PRINTER M.S.I. = OFF
- 3 AUTO - STATUS = OFF
- 4 AUTO FORM FEED = OFF
- 5 SERIAL MODE = ASCII
- 6 SERIAL BAUDS = 110
- 7 SERIAL BIT 7 = ON
- 8 SERIAL ACR-LF = ON
- 9 PARALLEL BIT 7 = OFF
- 0 PARALLEL ACR-LF = OFF
- A PARALLEL 24 PIN = ON
- B WIDE CARRIAGE = OFF

Mfg.: **Epson**  
 Model: **FX-85**  
 Type: 9 Pin Dot Matrix

Printer DIP Switch Settings:



Switch Functions:

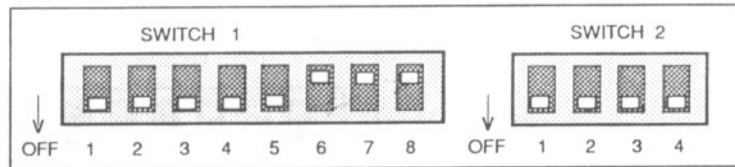
SW#	Function	Set	
2-1	Printer Select on=active	ON	☆
2-2	Cut Sheet Feeder on=active	OFF	
2-3	Skip Perf on=on off=off	OFF	☆
2-4	Auto LF on=CR+LF off=CR only	OFF	
1-1	Print on=compressed off=pica	OFF	
1-2	Slash Zero on=yes off=no	OFF	
1-3	Paper Detect on=inactive	OFF	
1-4	Mode on=Epson off=IBM	ON	☆
1-5	Print Mode on=bold off=stand.	OFF	
1-6	Intl. Characters -	OFF	
1-7	Intl. Characters -	OFF	
1-8	Intl. Characters -	OFF	

M-7000 Printer Menu:

1 PRINTER SQUELCH = OFF  
 2 PRINTER M.S.I. = OFF  
 3 AUTO - STATUS = OFF  
 4 AUTO FORM FEED = OFF  
  
 5 SERIAL MODE = ASCII  
 6 SERIAL BAUDS = 110  
 7 SERIAL BIT 7 = ON  
 8 SERIAL ACR-LF = OFF  
  
 9 PARALLEL BIT 7 = OFF  
 0 PARALLEL ACR-LF = OFF  
 A PARALLEL 24 PIN = OFF  
 B WIDE CARRIAGE = OFF

Mfg.: **Epson**  
 Model: **FX-86e / FX-286e**  
 Type: **9 Pin Dot Matrix**

Printer DIP Switch Settings:



Switch Functions:

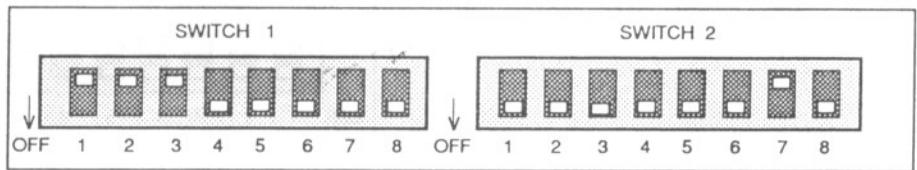
SW#	Function	Set	
1-1	Condensed Print on=on	OFF	
1-2	Slash Zero on=yes off=no	OFF	
1-3	Char.Tbl.on=graphic off=italic	OFF	
1-4	Commands on=IBM off=ESC/P	OFF	☆
1-5	Print on=NLQ off=Draft	OFF	
1-6	Intl. Characters - on=USA	ON	
1-7	Intl. Characters - on=USA	ON	
1-8	Intl. Characters - on=USA	ON	
2-1	Page Length on=12" off=11"	OFF	☆
2-2	Auto Sheet Feeder on=active	OFF	
2-3	Skip Perf on=on off=off	OFF	☆
2-4	Auto LF on=CR+LF off=CR only	OFF	

M-7000 Printer Menu:

1 PRINTER SQUELCH = OFF  
 2 PRINTER M.S.I. = OFF  
 3 AUTO - STATUS = OFF  
 4 AUTO FORM FEED = OFF  
  
 5 SERIAL MODE = ASCII  
 6 SERIAL BAUDS = 110  
 7 SERIAL BIT 7 = ON  
 8 SERIAL ACR-LF = OFF  
  
 9 PARALLEL BIT 7 = OFF  
 0 PARALLEL ACR-LF = OFF  
 A PARALLEL 24 PIN = OFF  
 B WIDE CARRIAGE = OFF

Mfg.: **Epson**  
 Model: **LQ-800 & LQ-1000**  
 Type: **24 Pin Dot Matrix**

Printer DIP Switch Settings:



Switch Functions:

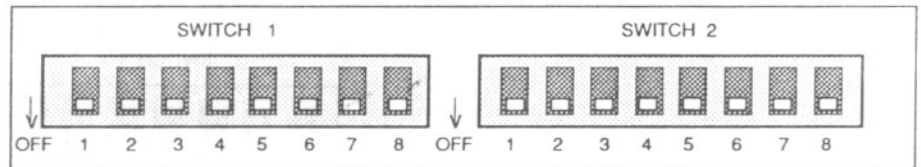
SW#	Function	Set
1-1	Intl. Characters -	ON
1-2	Intl. Characters -	ON
1-3	Intl. Characters -	ON
1-4	On=Large off=Small Buffer	OFF ☆
1-5	off=Letter Quality on=draft	OFF
1-6	Condensed char. on=on off=off	OFF
1-7	Skip Perf on=on off=off	OFF ☆
1-8	Cut Sheet Feeder on=active	OFF ☆
2-1	Paper Size off=11" on=12"	OFF
2-2	Not used.	OFF
2-3	Serial Interface	OFF
2-4	Serial Interface	OFF
2-5	Serial Baud Rate	OFF
2-6	Serial Baud Rate	OFF
2-7	Printer Select Signal	ON
2-8	Auto LF on=CR+LF off=CR only	OFF ☆

M-7000 Printer Menu:

- 1 PRINTER SQUELCH = OFF
- 2 PRINTER M.S.I. = OFF
- 3 AUTO - STATUS = OFF
- 4 AUTO FORM FEED = OFF
- 5 SERIAL MODE = ASCII
- 6 SERIAL BAUDS = 110
- 7 SERIAL BIT 7 = ON
- 8 SERIAL ACR-LF = ON
- 9 PARALLEL BIT 7 = OFF
- 0 PARALLEL ACR-LF = OFF
- A PARALLEL 24 PIN = ON
- B WIDE CARRIAGE = OFF (ON for LQ-1000)

Mfg.: **Epson**  
 Model: **LQ-850**  
 Type: **24 Pin Dot Matrix**

Printer DIP Switch Settings:



Switch Functions:

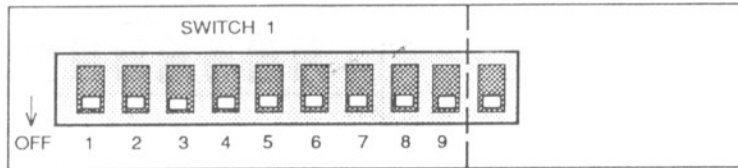
SW#	Function	Set
1-1	Intl. Characters -	OFF
1-2	Intl. Characters -	OFF
1-3	Intl. Characters -	OFF
1-4	Character Table on=graphics	OFF
1-5	Print Dir.on=bidir off=unidir	OFF ☆
1-6	Not used.	OFF
1-7	Cut Sheet Feeder on=active	OFF ☆
1-8	Receive Buffer on=0K off=6K	OFF
2-1	Paper Size off=11" on=12"	OFF
2-2	Skip Perf on=on off=off	OFF ☆
2-3	Serial Interface	OFF
2-4	Serial Interface	OFF
2-5	Serial Baud Rate	OFF
2-6	Serial Baud Rate	OFF
2-7	Short tear-off mode on=on	OFF
2-8	Auto LF on=CR+LF off=CR only	OFF ☆

M-7000 Printer Menu:

- 1 PRINTER SQUELCH = OFF
- 2 PRINTER M.S.I. = OFF
- 3 AUTO - STATUS = OFF
- 4 AUTO FORM FEED = OFF
- 5 SERIAL MODE = ASCII
- 6 SERIAL BAUDS = 110
- 7 SERIAL BIT 7 = ON
- 8 SERIAL ACR-LF = ON
- 9 PARALLEL BIT 7 = OFF
- 0 PARALLEL ACR-LF = OFF
- A PARALLEL 24 PIN = ON
- B WIDE CARRIAGE = OFF

Mfg.: **Diconix**  
 Model: **D150**  
 Type: Ink Jet

Printer DIP Switch Settings:



Switch Functions:

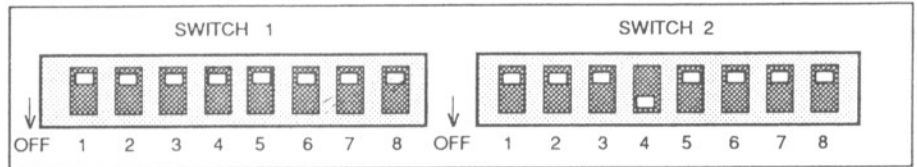
SW#	Function	Set
1-1	CR off=CR only on=CR+LF	OFF
1-2	LF off=CR+LF on=LF only	OFF
1-3	Perf Skip off=no on=yes 1"	OFF
1-4	Page Length on=12" off=11"	OFF
1-5	Font Select off=draft on=final	OFF
1-6	Mode off=Epson on=IBM	OFF
1-7	Intl. Characters -	OFF
1-8	Intl. Characters -	OFF
1-9	Intl. Characters -	OFF
1-10	DO NOT USE!	OFF

M-7000 Printer Menu:

- 1 PRINTER SQUELCH = OFF
- 2 PRINTER M.S.I. = OFF
- 3 AUTO - STATUS = OFF
- 4 AUTO FORM FEED = OFF
  
- 5 SERIAL MODE = ASCII
- 6 SERIAL BAUDS = 110
- 7 SERIAL BIT 7 = ON
- 8 SERIAL ACR-LF = OFF
  
- 9 PARALLEL BIT 7 = OFF
- 0 PARALLEL ACR-LF = OFF
- A PARALLEL 24 PIN = OFF
- B WIDE CARRIAGE = OFF

Mfg.: **Star**  
 Model: **NR-15**  
 Type: 24 Pin Dot Matrix- Wide Carriage

Printer DIP Switch Settings:



Switch Functions:

SW#	Function	Set
1-1	Paper Detect on=inactive	ON
1-2	On=Select IN Signal to Low	ON
1-3	On=Ignore Download Characters	ON
1-4	Linefeed on=1/6" off=1/8"	ON ☆
1-5	On=LF from Host off=auto LF	ON ☆
1-6	On=No Bottom Margin off=1"	ON
1-7	On=10CPI off=17CPI Condensed	ON
1-8	Slash Zero on=yes off=no	ON
2-1	Print on=Draft off=NLQ	ON
2-2	Mode on=Standard off=IBM	ON
2-3	On=IBM-P off=IBM-G	ON
2-4	On=1/216" C-1 off=1/144" C-2	OFF ☆
2-5	Auto LF on=CR+LF off=CR only	ON
2-6	Intl. Characters -	ON
2-7	Intl. Characters -	ON
2-8	Intl. Characters -	ON

M-7000 Printer Menu:

- 1 PRINTER SQUELCH = OFF
- 2 PRINTER M.S.I. = OFF
- 3 AUTO - STATUS = OFF
- 4 AUTO FORM FEED = OFF
- 5 SERIAL MODE = ASCII
- 6 SERIAL BAUDS = 110
- 7 SERIAL BIT 7 = ON
- 8 SERIAL ACR-LF = ON
- 9 PARALLEL BIT 7 = OFF
- 0 PARALLEL ACR-LF = OFF
- A PARALLEL 24 PIN = ON
- B WIDE CARRIAGE = ON