

YAMAHA



DIGITAL RHYTHM PROGRAMMER

PROGRAMMATEUR DE RYTHME

DIGITAL PROGRAMMIERBARES RHYTHMUSGERÄT

OWNER'S MANUAL

MANUEL D'UTILISATION

BEDIENUNGSANLEITUNG

INTRODUCTION

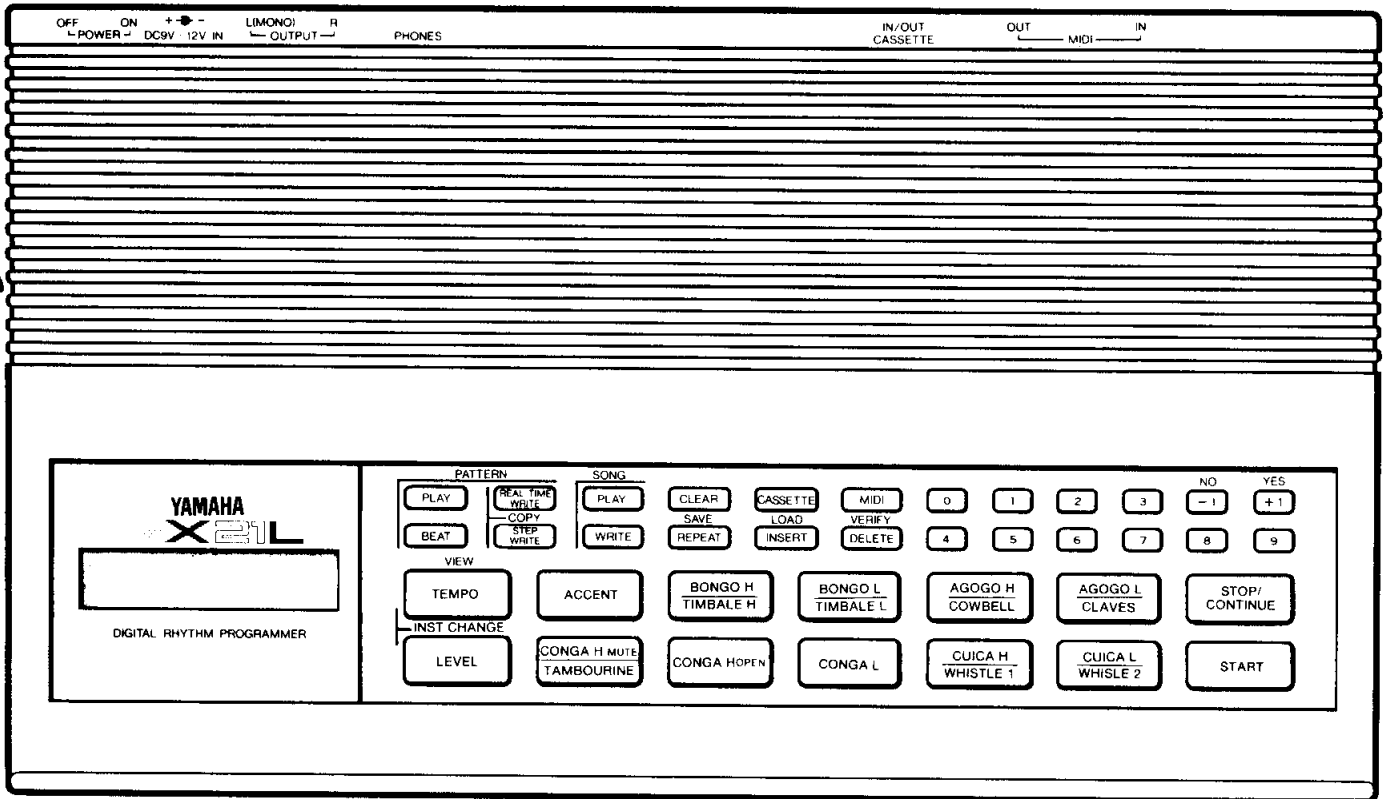
Congratulations on your purchase of a Yamaha RX21L Digital Rhythm Programmer! Your RX21L represents the crystallization of the most sophisticated electronic music technology, combining advanced microcomputer control with a top-quality digital PCM sound storage and reproduction system. With the RX21L you will be able to program virtually any type of rhythm pattern, and since the instrument sounds are digitally recorded they are indistinguishable from live percussion instruments.

To ensure that the RX21L will give you maximum performance and versatility, we urge you to read this operation manual carefully before attempting to operate the unit. A handy diagram of the RX21L control panel allows you to instantly locate any controls mentioned in the text, so that you can familiarize yourself with the operations as easily and effortlessly as possible.

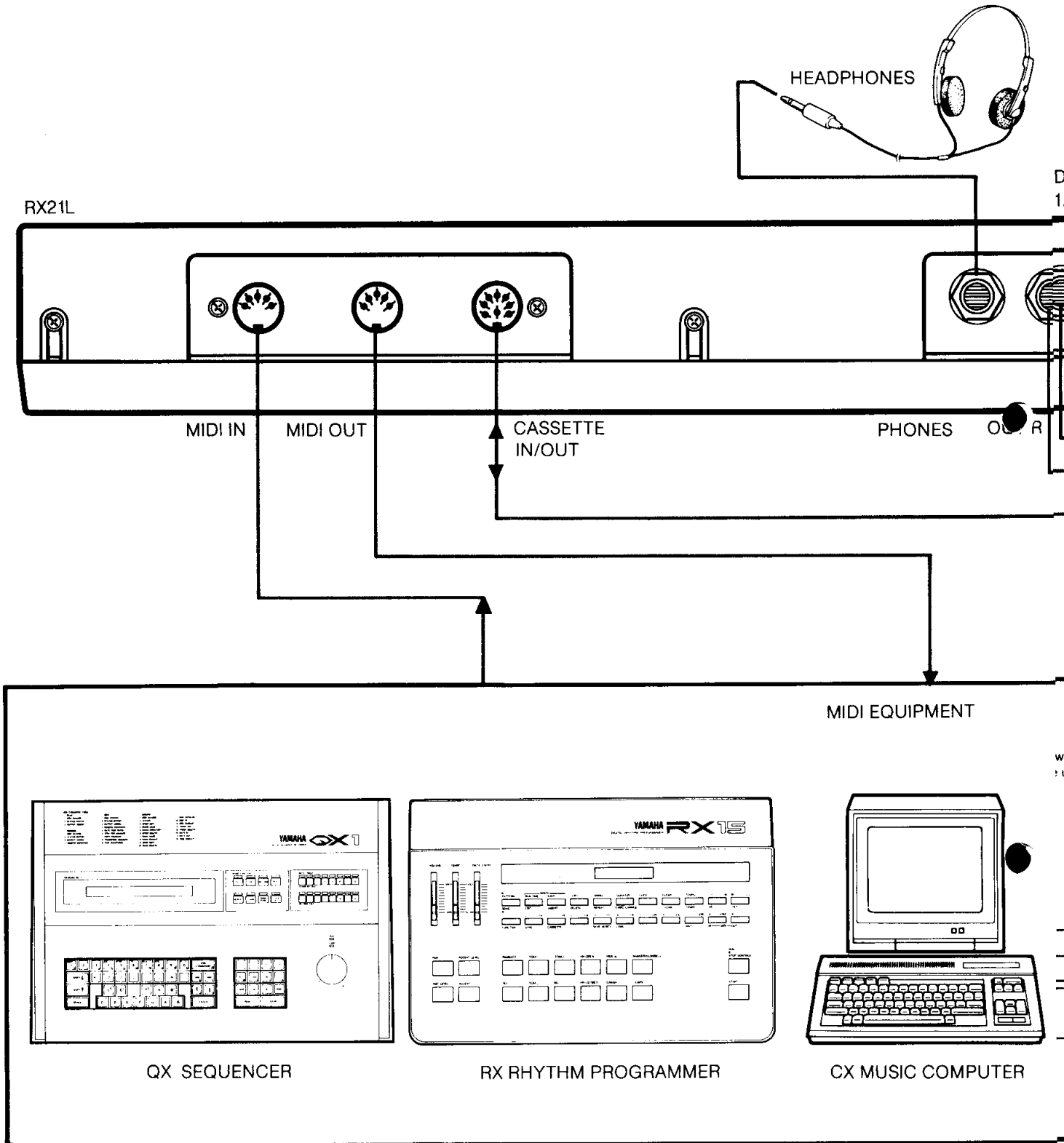
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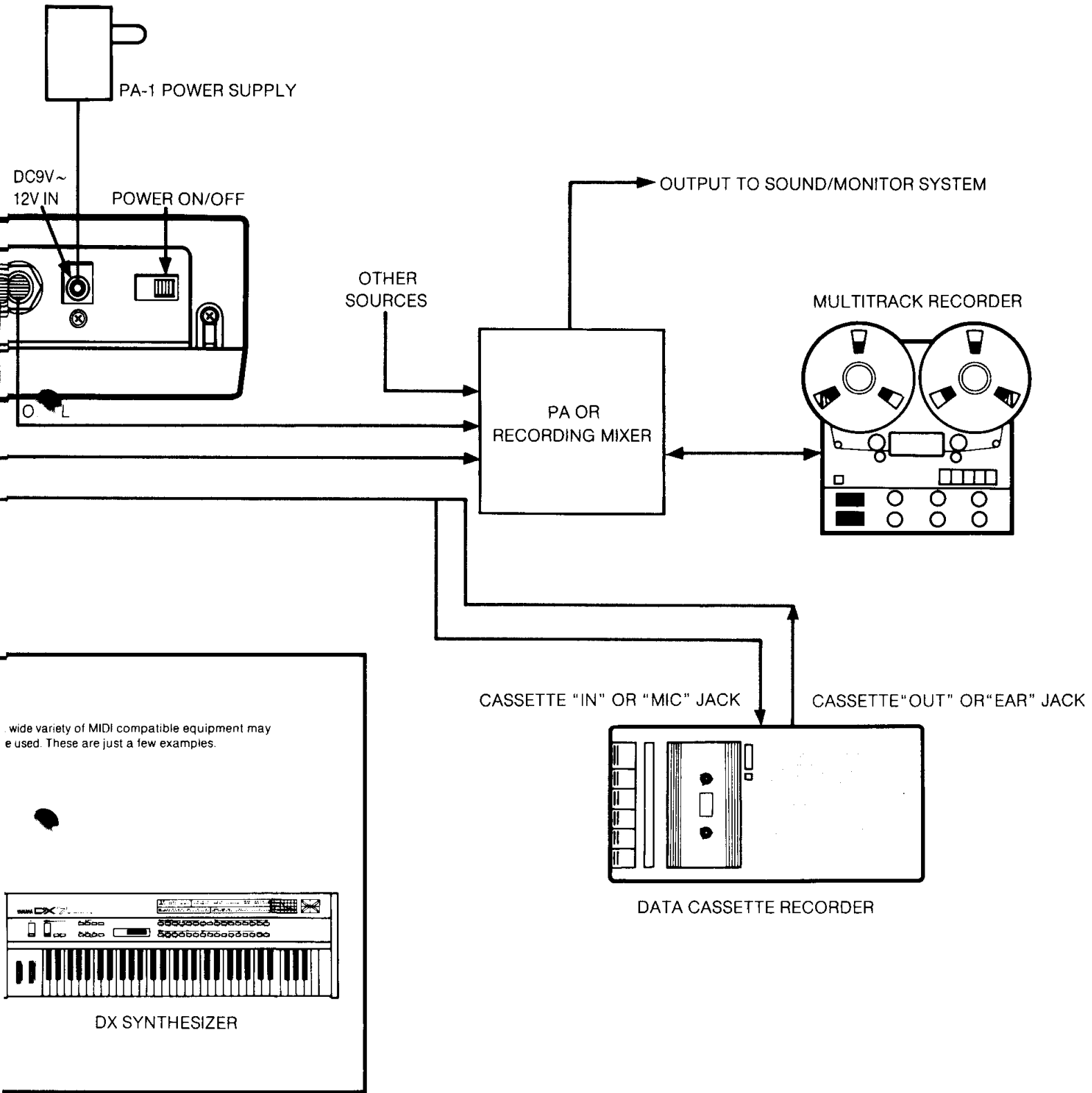
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CONTROL PANEL



CONNECTIONS





PRECAUTIONS

- Avoid placing the RX21L in locations exposed to direct sunlight or high temperatures, excessively high or low humidity, high dust concentration, or vibration.
- Be sure to connect the RX21L to an AC power supply that meets the power supply specifications listed on the rear of the unit. Ideally, you should use the PA-1 power supply unit supplied with the RX21L.
- If there is any danger of lightning occurring nearby, remove the power plug from the wall socket in advance.
- Be sure to make all connections properly, as illustrated in the CONNECTIONS diagram.
- To avoid damaging your speakers and other playback equipment, turn off the power of all related equipment before making connections.
- Do not use excessive force in handling control switches and knobs.
- To avoid broken cords and short circuits, be sure to unplug all connectors by grasping the respective plugs—NOT the cords.
- Remove the power plug from the AC mains socket if the unit is not to be used for an extended period of time.
- Remove all plugs and connections if the unit is to be transported, to prevent damage to the cords and jacks.
- Do not use solvents such as benzene or paint thinner to clean the unit. Do not use insecticides or other pressurized spray products in proximity to the unit. Wipe off the exterior with a soft cloth.

The RX21L memory has a Lithium backup battery so that patterns and songs are not lost when you turn the power off. This battery has a life of about 5 years. When its voltage level starts to fall below a usable level, the RX21L's LCD will display an Error Message "NO BATTERY" when you turn it on (see the ERROR MESSAGES section in the accompanying Programming Reference Guide). In this case, replacement will be imminent, and you should contact your local Yamaha dealer.

EFFECTS ON OTHER ELECTRONIC EQUIPMENT:

Since this unit incorporates digital circuitry, simultaneous use of other equipment such as TVs, radios, etc. in close proximity may cause noise and erroneous operation. If this occurs, separate the affected units sufficiently to eliminate the problem. It is also a good idea to use separate line filters on each piece of equipment.

SETTING UP

Please read the PRECAUTIONS section of this manual before setting up your RX21L.

The CONNECTIONS diagram at the front of this manual shows you how to make the simple connections necessary to set up your RX21L. Use the PA-1 power supply, or any similar power supply to convert the AC voltage to the voltage required to power the RX21L (9 to 12 V).

A brief output pulse appears at the RX21L outputs when the power is initially turned on. To prevent this from possibly damaging your speaker system, make sure the master volume control of your sound system, or the volume of the mixer channel to which the RX21L is connected, is set to minimum before the RX21L is turned on. Better yet, turn on the RX21L first, then your sound system.

The RX21L has an LCD (Liquid Crystal Display) panel that keeps you informed of what is happening at any moment (for example, which pattern is playing, or what editing operation you are carrying out). When you turn on the RX21L, the LCD shows "YAMAHA RX21L" for about a second, then switches to the "SELECT PTN 00", the basic select pattern mode display which prompts you to select any pattern and then play it back. (The LCD also displays Error Messages to indicate any faults or operating errors: see the ERROR MESSAGES section of the Programming Reference Guide).

Without any further operations, the RX21L is now ready for you to play.

NOTE:

When shipped, the RX21L memory contains 29 rhythm patterns and 2 songs. Before you modify these or store your own personal patterns, we suggest that you save the pre-programmed patterns onto cassette tape. Refer to *Cassette Operations*, page 36.

THE INSTRUMENTS

Getting to Know the RX21L Instruments

The RX21L contains sixteen superb latin percussion instrument sounds. Because they are digitally recorded, they are indistinguishable from the real thing, and allow you to create totally authentic latin rhythms. The RX21L instruments can be played in real-time (without programming patterns or songs) by tapping on the black instrument buttons.

Using either a pair of headphones plugged into the RX21L PHONES jack, or a sound system fed from the RX21L L and R OUTPUT jacks, turn the RX21L on and repeatedly tap any of the black instrument buttons (BONGO H, CONGA L, etc.). You can now "play" all the instrument buttons to become familiar with their sound.

INSTRUMENT BUTTONS



RX21L INSTRUMENT CHART

The following chart lists all the instruments available:

Instrument Button	Instruments
BONGO H	High bongo
BONGO L	Low bongo
TIMBALE H	High timbale
TIMBALE L	Low timbale
AGOGO H	High agogo
AGOGO L	Low agogo
COWBELL	Cowbell
CLAVES	Claves
CONGA H MUTE	Muted high conga
CONGA H OPEN	Open high conga
CONGA L	Low conga
TAMBOURINE	Tambourine
CUICA H	High cuica
CUICA L	Low cuica
WHISTLE 1	Short whistle
WHISTLE 2	Long whistle

NOTE:

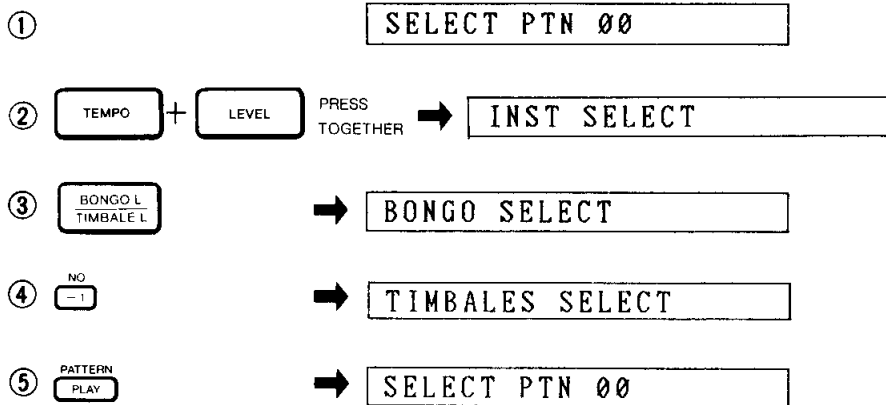
The following instrument pairs will not produce sound together (on the same beat). Even if you press both buttons simultaneously or trigger both at the same time using MIDI note numbers (see page 42), only one will sound. CUICA HI/CUICA LO, WHISTLE 1/WHISTLE 2, CONGA HI MUTE/CONGA HI OPEN.

Instrument Select

Some of the instrument buttons have two instruments.

You can switch between these two by pressing the TEMPO and LEVEL buttons at the same time. The LCD will read "INST SELECT" so press the instrument button that you want to switch (for instance BONGO). The LCD will read "BONGO SELECT" (or whatever instrument you have selected). Switch instruments by pressing +1/YES or -1/NO. You can exit instrument select mode by pressing a button other than an instrument.

Instrument Select (Example: Switch from Bongo to Timbales)



You can switch instruments at any time, even while writing patterns. Pressing +1/YES will select the upper instrument, and -1/NO the lower. When you switch paired instruments (for example BONGO HI or BONGO LO), both instruments will be switched at the same time.

Total Level

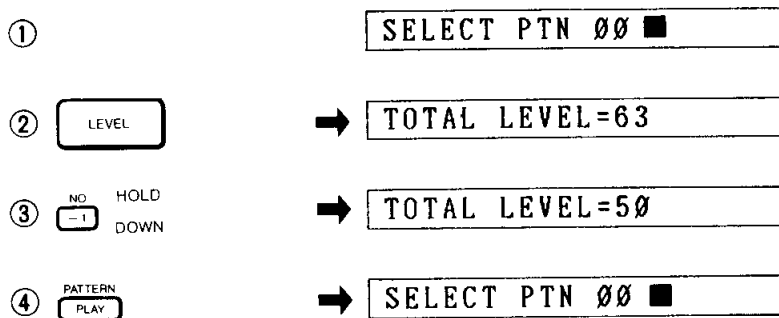
The RX21L lets you adjust both the total level (volume) of all the instruments combined and individually adjust the level of each instrument so you can achieve the best overall balance or "drum mix".

The total level mode is entered simply by pressing the blue LEVEL button. The LCD will read "TOTAL LEVEL=nn" (nn being the volume level).

The total level is adjustable from 00 (silence) to 63. Pressing the +1/YES or -1/NO buttons increases or decreases the volume by one, respectively. Holding either button down will cause the numbers to change continuously and rapidly. The total level, once set, remains at the selected value even after turning off the RX21L.

Press PATTERN PLAY to exit the total level mode.

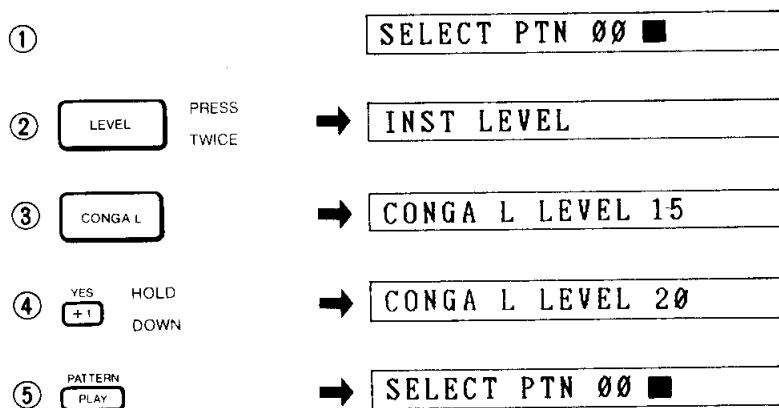
Total Level (Example: reducing total level from 63 to 50)



Instrument Level

To set the individual instrument level, press the LEVEL button twice. The LCD will read INST LEVEL to indicate that the individual instrument level mode is now active. Pressing any black instrument button then permits adjustment of that instrument's level via the +1/YES or -1/NO keys. The LCD panel will indicate the selected instrument followed by the currently set level—e.g. "CONGA L LEVEL 15". The level is adjustable from 00 to 31. It's good practice to set the individual instrument levels at 15, then adjust each instrument up or down to get your desired mix. The instruments can be adjusted in any sequence. Press the PATTERN PLAY button to exit the instrument level mode.

Instrument Level (Example: Increase CONGA L level from 15 to 20)



Accents

When you're playing on the instrument keys, as described in the "GETTING TO KNOW THE RX21L INSTRUMENTS" section, holding down the green ACCENT key while tapping an instrument key will cause that instrument to play louder, just as if a drum has been hit harder. If you happen to simultaneously tap more than one instrument key while holding down the ACCENT key, all the instruments played will sound louder.

When you record a pattern, pressing the ACCENT key to add an accent to a beat (no need to press an instrument key at the same time) will affect ALL instruments sounding on that beat, according to their individual accent levels. For instruments which are not to be accented, simply set their accent level to zero.

Stereo Positioning

Output from the RX21L can be either in STEREO (connect cables to both L and R outputs), or MONO (connect to L output ONLY). When using the stereo outputs, instruments are arranged as follows, with a pan value of 0 being far right, and value of 15 far left.

Instrument	Pan setting
BONGO H	6
BONGO L	4
TIMBALE H	10
TIMBALE L	6
AGOGO H	5
AGOGO L	3
COWBELL	8
CLAVES	11
CONGA H MUTE	12
CONGA H OPEN	12
CONGA L	10
TAMBOURINE	13
CUICA H	9
CUICA L	7
WHISTLE 1	3
WHISTLE 2	13

Setting Accent Levels

The accent level for each instrument can be set independently, making it possible to set the most natural level in relation to the instrument's normal level. To enter the accent level mode, press the LEVEL button twice, then press an INST button while holding down the ACCENT button. The LCD will read "XXXX AC LEVEL=nn" ("XXXX" being the instrument and "nn" the accent level).

The accent level can then be adjusted by the +1/YES or -1/NO keys. The accent level range is the same as the instrument level range: 00-31. The accent level setting, however, is added to the instrument level setting to produce the actual accent level. For example, if the instrument level is set at 15 and the accent level for that instrument is set at 05, then the actual accent level will be 20. The actual accent level cannot exceed 31, so if the instrument level of an instrument is set to the maximum 31 setting, no accenting of notes for that instrument is possible. Once the accent level mode is active, instruments can be selected and adjusted in any sequence. Press the PATTERN PLAY button to exit the accent level mode.

Accent Level (Example: increase TIMBALE L accent level from 5 to 15)

- ① SELECT PTN 00 ■

- ② LEVEL PRESS
TWICE → INST LEVEL

- ③ ACCENT + BONGO L
TIMBALE L → TI L AC LEVEL 05

- ④ YES
+1 HOLD
DOWN → TI L AC LEVEL 15

- ⑤ PATTERN
PLAY → SELECT PTN 00 ■

PATTERN OPERATIONS

Pattern Selection

With the RX21L, A "pattern" denotes a one bar (one measure) percussion sequence, which repeats when you play it back. The RX21L is capable of storing a total of 50 different patterns in its internal pattern memory (pattern 00 through 49). You may store your personally programmed rhythm patterns in any of these and they will be preserved even if the power is turned off. When the RX21L is shipped, the internal pattern memory contains 29 patterns pre-programmed by Yamaha. Before you edit these or create your own patterns, save these pre-programmed patterns onto cassette tape. (See Cassette Operations, page 36)

To select a pattern the RX21L must be in the pattern mode—this is the mode that is active when the RX21L is initially turned on. The LCD panel will show "SELECT PTN 00". A rectangular "cursor" will be flashing on the right side of the display, prompting you to enter a pattern number. This cursor will normally appear in any display where data can be entered.

Two methods of pattern selection are available:

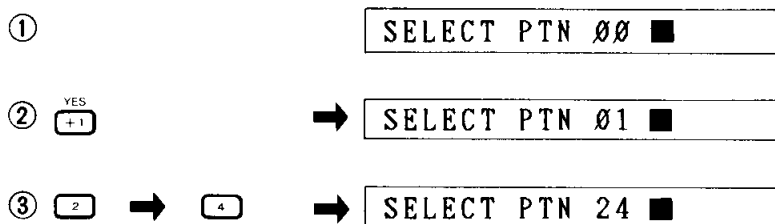
1) Selecting Patterns Using the -1/NO and +1/YES Buttons

Pressing the -1/NO or +1/YES buttons decreases or increases the pattern number by one, respectively. This method of selection is easy when going to an adjacent or nearby pattern number, but when selecting a pattern in a distant number range, the direct numeric selection method is quicker.

2) Selecting Patterns Using the Numeric Buttons

The two rows of grey numbered buttons may be used for pattern selection. Entering the desired pattern number using these buttons immediately selects that pattern. You must input two digits: e.g. for pattern number 7 you must press 07.

Selecting Patterns (Example: patterns 00, 01, 24)



Playback of Patterns

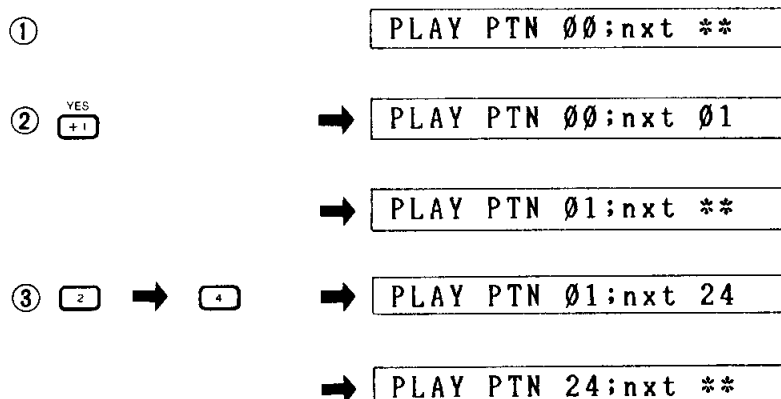
To play back the selected pattern, simply press the red START button. The LCD will switch to "PLAY PTN *pp*;nxt **" (*pp* being the selected pattern number). To stop pattern playback press the blue STOP/CONTINUE button. The pattern can be restarted by pressing the STOP/CONTINUE button again. In this case the pattern continues from the exact point at which it was stopped, rather than starting from the first beat of the pattern. To start from the first beat of the pattern, press START.

Pattern Change During Playback

While a pattern is playing, you can select a new pattern, either by using the -1/NO or +1/YES buttons (to select the next lowest or highest pattern number, respectively) or the numerical buttons (enter two digits: for example, "08" for pattern 8). The newly entered pattern number will be displayed at the right hand side of

the LCD, and the RX21L will switch to the new pattern at the end of the pattern that is presently playing (i.e. at the end of the measure). The LCD will then display only the new pattern number.

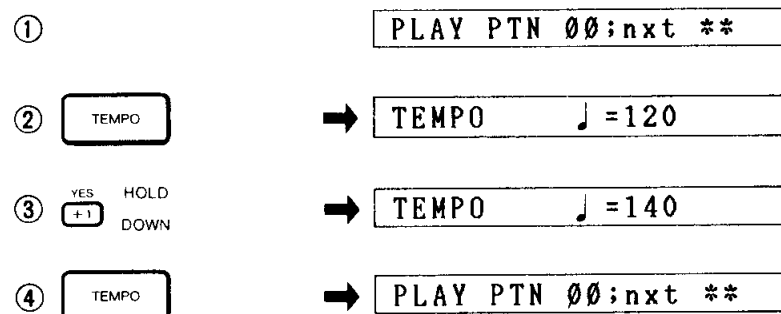
Pattern Change During Playback (Example: Patterns 00 → 01 → 24)



Tempo Control

The pattern tempo can be adjusted at any time (even while playing back or recording) by pressing the blue TEMPO button. The LCD will display the last tempo that was set (even if the RX21L has been turned off since then) in quarter notes per minute. You can then adjust the tempo by using the -1/NO and +1/YES buttons. Pressing and releasing these buttons decreases or increases the tempo by one; holding them down permits rapid continuous decrease or increase, respectively. The range available is 40 to 250 quarter notes per minute. Pressing the TEMPO button again returns the RX21L to the mode it was in before tempo setting.

TEMPO Function (Example: Change tempo from 120 to 140 during playback of pattern 00)



Real Time Pattern Programming

NOTE:

An understanding of the QUANTIZE function, described later in this chapter, is essential for effective use of the real time write function. We recommend that before actually trying out the real time write function you should read through the QUANTIZE section (on page 19). Then come back to this section and try out the function.

The RX21L permits pattern programming using two different methods: REAL TIME WRITE and STEP WRITE. The most direct of these is REAL TIME WRITE. This function lets you “play” your rhythm on the instrument keys, adding new instruments and rhythm lines until the pattern is complete.

First, select the pattern you wish to program.

NOTE:

When the RX21L is shipped, the internal pattern memory contains 29 patterns and 2 songs pre-programmed by Yamaha. Before you edit these or create your own patterns, save these pre-programmed patterns onto cassette tape. (See Cassette Operations, page 36)

Also, ensure (by playing back if necessary) that the selected pattern number does not contain a pattern, if you want to avoid losing an existing pattern. Enter the real time write mode by pressing the REAL TIME WRITE button. The LCD will give the following indication: "REAL L=*ll*,Q=1/*qq*" (*ll* being the pattern length, and *qq* being the quantize rate—we'll explain these terms later). If you have selected a pattern number that already contains data, a square black cursor will flash at the left side of the LCD.

For this initial explanation, we'll assume that you've selected a pattern number that is empty of data. You can now set the length and quantize rate of your pattern. Press the BEAT button. If you have selected a non-existent pattern (50-99), the LCD will show "ILLEGAL NUMBER!", and return to the "SELECT PTN pp" display. You should now select another pattern number.

Normally, the LCD will switch to "LENGTH=*ll* /16" (*ll* is the pattern length) with the cursor flashing to the right of the length number. The RX21L measures patterns in sixteenth notes, so for example a bar of 4/4 time (four quarter notes per bar) would be indicated by the setting "16/16" (sixteen sixteenth notes per bar); a bar of 3/4 time (three quarter notes per bar) would be "12/16" (twelve sixteenth notes per bar), and so on. The following chart indicates the relationship between Length settings and time signatures.

LENGTH SETTING (<i>ll</i> /16)	TIME SIGNATURE
16	4/4
15	15/16
14	7/8
13	13/16
12	3/4 or 6/8
11	11/16
10	5/8
09	9/16
08	2/4
07	7/16
06	3/8
05	5/16
04	1/4
03	3/16
02	1/8
01	1/16

Use the -1/NO and +1/YES buttons to input the length setting. Press BEAT again to enter the Quantize rate. The LCD will switch to "QUANTIZE=1/*qq*" (where *qq* = the quantize rate) with the cursor flashing to the right of the quantize number. You can now use the -1/NO or +1/YES buttons to "scroll through" the available quantize numbers (12, 24, 16, 32) until you reach the desired setting. Press BEAT again to return the LCD to the previous real time write mode display.

To review, the real time write setting procedure is as follows:

1. Press REAL TIME WRITE to enter the real time write mode.
2. Press BEAT, then enter pattern length setting with -1/NO or +1/YES buttons.
3. Press BEAT again, then enter quantize rate with -1/NO or +1/YES buttons.
4. Press BEAT a third time, to return the RX21L to the real time write mode.

You are now ready to program your pattern. Tap the red START button, and you'll hear the "click track" rhythm accents.

If you have selected pattern 00, the LCD will switch to "PTN 00 RECORDING", and you'll see the cursor moving from left to right once every measure. Regardless of the length of the pattern, the click will be heard at the start of each group of four sixteenth notes. In other words, on every quarter note beat. Also, the first beat of each bar will be accented. The RX21L will continue cycling through the full length of the pattern while you record. You can now set your tempo, as previously described, and start playing.

NOTE:

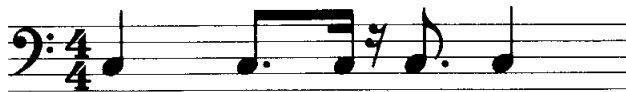
There are two limitations on using instruments in a pattern: AGOGO (Hi, Lo) cannot be used in the same pattern with COWBELL or CLAVES, and CUICA (Hi, Lo) cannot be used in the same pattern with WHISTLE (1, 2).

In the real time record mode, everything you play will be entered into the pattern, and you'll hear it replayed every time the pattern is repeated. There's no need to try and input all the instruments at once: you can input one instrument at a time, and gradually build up a pattern. Enter accented beats by tapping the ACCENT button (see "Accents" in the section entitled THE INSTRUMENTS). Here's an example of how a basic 4/4 time pattern is built up:

PLAY TAMBOURINE



THEN PLAY CUICA LO



THEN PLAY CUICA HI



TO MAKE THE FOLLOWING PATTERN



CUICA HI
CUICA LO
TAMBOURINE

Made a mistake, or want to change a part? It's easy—single notes can be cleared by holding down the CLEAR button (top row) and tapping the appropriate instrument button at the timing of the note that is to be cleared. You can even clear accents in this way. You can clear the entire part of an instrument by holding down its button together with the CLEAR button, for the entire length of the pattern. Once you've completed your pattern, simply press STOP/CONTINUE, and recording will cease. The LCD will revert to the "SELECT PTN *pp*" display.

You can modify the pattern at any time (add new instruments or accents, clear some parts, etc.) simply by selecting the pattern, entering the real time write mode, pressing the START button and writing/clearing as usual. The length of a programmed pattern CANNOT be changed. The quantize rate can only be changed by using the Beat Exchange function (this is described later on page 22).

Real Time Write (Example: 3/4 time, Quantize Rate 1/16, on pattern 00)

- ① SELECT PTN 00 ■
 - ② REAL TIME WRITE → REAL L=//, Q=1/qq
 - ③ BEAT → LENGTH=// ■ /16
 - ④ NO
-1 OR YES
+1 → LENGTH=12 ■ /16
 - ⑤ BEAT → QUANTIZE=1/qq ■
 - ⑥ NO
-1 OR YES
+1 → QUANTIZE=1/16 ■
 - ⑦ BEAT → REAL L=12, Q=1/16
 - ⑧ START → PTN00 RECORDING
- PLAY INSTRUMENT KEYS TO ENTER PATTERN. USE ACCENT KEY TO ENTER ACCENTS, CLEAR KEY PLUS INSTRUMENT KEY TO CLEAR MISTAKES.
- ⑨ STOP/
CONTINUE → SELECT PTN 00 ■

Step Write Pattern Programming

NOTE:

An understanding of the QUANTIZE function, described later in this chapter, is essential for effective use of the step write function. We recommend that before actually trying out the step write function you should read through the QUANTIZE section (on page 19). Then come back to this section and try out the function.

While the Real Time Write function, described above, allows you to input rhythm patterns in real time by playing on the instrument keys, the Step Write function is used to input notes one at a time. This method is ideal for programming rhythm patterns from written scores. It also makes it possible to input complex rhythm patterns that would be extremely difficult to program using the real time method. First, select the pattern number you wish to program.

Also, ensure (by playing back if necessary) that the selected pattern number does not contain a pattern, if you want to avoid losing an existing pattern.

Enter the step write mode by pressing the STEP WRITE button. The LCD will give the following indication: "STEP L= ll ,Q= $1/qq$ " (ll being the pattern length, and qq being the quantize rate). If you have selected a pattern number that already contains data, a square black cursor will flash at the left side of the LCD. If you have selected a non-existent pattern (50-99), the LCD will show "ILLEGAL NUMBER!", and return to the "SELECT PTN pp " display.

For this initial explanation, we'll assume that you've selected a pattern number that is empty of data. You can now set the length and quantize rate of your pattern.

Press the BEAT button.

Normally, the LCD will switch to "LENGTH= ll /16" (ll is the pattern length) with the cursor flashing to the right of the length number. The RX21L measures patterns in sixteenth notes, so for example a bar of 4/4 time (four quarter notes per bar) would be indicated by the setting "16/16" (sixteen sixteenth notes per bar); a bar of 3/4 time (three quarter notes per bar) would be "12/16" (twelve sixteenth notes per bar), and so on. The chart in the REAL TIME PATTERN PROGRAMMING section indicates the relationship between Length settings and time signatures.

Use the -1/NO and +1/YES buttons to input the length setting

Press BEAT again to enter the Quantize rate. The LCD will switch to "QUANTIZE= $1/qq$ " (where qq = the quantize rate) with the cursor flashing to the right of the quantize number. You can now use the -1/NO or +1/YES buttons to "scroll through" the available quantize numbers (12, 24, 16, 32) until you reach the desired setting. Press BEAT again to return the LCD to the previous step write mode display.

To review, the step write setting procedure is as follows:

1. Press STEP WRITE to enter the step write mode.
2. Press BEAT, then enter pattern length setting with -1/NO or +1/YES buttons.
3. Press BEAT again, then enter quantize rate with -1/NO or +1/YES buttons.
4. Press BEAT a third time, to return the RX21L to the step write mode.

You are now ready to program your pattern. Tap the red START button. If you have selected a non-existent pattern (50-99), the LCD will show "ILLEGAL NUMBER!", and return to the "SELECT PTN pp " display.

Normally, the LCD will switch to "PTN pp : BEAT 01", prompting you to input the first beat of the pattern. You can now enter an instrument on beat one by pressing the appropriate instrument button, or a rest by pressing the +1/YES button. In either case, the beat will advance one count and you are then ready to enter the next instrument or rest. The LCD will indicate the new beat count, and the cursor (a small horizontal dash at the bottom of the display) will move one position to the right. This process is continued until the last beat of the bar (the number of beats per bar is determined by the setting of the QUANTIZE function, described later in this chapter).

The RX21L will then cycle back to the first beat of the bar, allowing you to continue to add new instruments. In the step write mode, only one instrument (or accent) can be entered at a time. If more than one instrument is to be entered on a beat, you can enter instruments one at a time on successive cycles through the pattern. Another method is to use the -1/NO button to cycle backwards through the bar, so that you can keep returning to the same beat and add more instruments, if desired.

NOTE:

Each time you move through the bar using the -1/NO or +1/YES keys, you'll hear whatever has been programmed into each beat. It's rather like moving through a video or movie frame by frame. Also, you can hold down a -1/NO or +1/YES key and move rapidly through the bar, which will speed up your step write ability tremendously, once you learn to release the -1/NO or +1/YES key on the right beat.

Exit the step write mode by pressing the STOP/CONTINUE button

Here's a simple example of a rhythm pattern programmed in the Step Write Mode, using a quantize rate of 1/16 (this pattern is the same as the one you entered in the real time mode). It's shown here in regular music notation, and underneath the part of each instrument is shown in the form of a Dot Display. You can call up a Dot Display on the RX21L's LCD, as described in the STEP WRITE DOT DISPLAY section later in this chapter. Each dot represents a note (entered by pressing an instrument key) and each dash represents a rest (entered by pressing the +1/YES key).

beat	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CUICA HI	---	•-	:-	•-	•-	:-	---	•-	•-	:-	---	•-	•-	:-	---	•-
CUICA LO	•	---	:-	•	---	:-	•	---	:-	•	---	:-	•	---	:-	•
TAMBOURINE	•	---	:-	•	---	:-	•	---	:-	•	---	:-	•	---	:-	•

You'll notice that the tambourine part has a lot of rests. These can be rapidly entered by holding down the +1/YES key until you reach the next tambourine beat.

STEP WRITE mistakes can be corrected in the same way as REAL TIME mistakes: when you reach the beat at which the erroneous entry was made, simply hold down the CLEAR button and press the instrument button corresponding to the instrument to be cleared. Patterns (including, of course, those you created in the REAL TIME mode) can be edited by adding new parts and deleting unwanted parts simply by re-entering the step write mode and stepping through the pattern using the +1/YES button (or the -1/NO button, if the error is near the end of the pattern) until the edit point is located. The addition of new parts and deletion of unwanted parts is carried out as described above.

The length of a programmed pattern CANNOT be changed. The quantize rate can only be changed by using the Beat Exchange function (this is described later on page 22).

Step Write (Example: 4/4 Time, Quantize Rate 16, on pattern 00)

- ① ■
- ② →
- ③ →
- ④ HOLD DOWN →
- ⑤ →
- ⑥ OR →
- ⑦ →
- ⑧ ENTER TAMBOURINE ON FIRST BEAT
 →
- ⑨ ENTER REST ON SECOND BEAT
 →
PLAY INSTRUMENT KEYS TO ENTER MORE NOTES. USE ACCENT KEY TO ENTER ACCENTS, +1/YES KEY TO ENTER RESTS, CLEAR KEY PLUS INSTRUMENT KEY TO CLEAR MISTAKES.
- ⑩ → ■

You can now playback your pattern in the usual way, adjusting the tempo as desired.

Quantize

Basically, quantize determines the smallest note-increments which can be programmed. The available quantize values are 1/12, 1/24, 1/16, and 1/32. This is the order in which the values appear when you "scroll through" the quantize values with the +1/YES key.

When you set the quantize rate to 1/16, the shortest notes that can be entered in either the real time or the step write modes are 1/16th notes—i.e., the maximum number of notes that can be entered in one 4/4 bar is 16.

QUANTIZE Applied to the Real Time Write Mode

In the real time write mode, this has an "error correcting" function. In other words, if your timing while playing on the instrument keys is a little off, the off-time beats will be recorded at the nearest quantized beat. Thus, for more subtle rhythms, it is best to select a higher quantize rate (1/32 or 1/24) while simpler rhythms can be entered more accurately and rapidly, using the lower quantize rates (1/12 or 1/16).

QUANTIZE Applied to the Step Write Mode

In the step write mode, the quantize function can save time by minimizing the number of steps required to enter each part. If, for example, the quantize rate is set to 1/32, the beat count will proceed from 1 to 32 per bar. This is fine if 32nd notes are to be entered, but a regular 8-beat claves line would require the entry of three rests between each claves beat. Generally, then, it is better to use a lower quantize rate,

and enter the simpler rhythms. You can then switch to a higher quantize rate using the BEAT EXCHANGE function (described on page 22) and enter more subtle or complex rhythms (for example, a syncopated cuica part).

For entering triplet patterns, you'll need to use the 1/12 or 1/24 quantize rates. Here's our basic 4/4 time pattern, using the 1/12 quantize rate to program 1/12th notes (quarter note triplets).

beat	1	2	3	4	5	6	7	8	9	10	11	12	
CUICA HI	-	-	•	-	:	•	-	-	:	•	-	-	
CUICA LO	•	-	-	:	-	•	•	-	:	-	•	-	
TAMBOURINE	•	-	-	:	-	-	•	-	:	-	•	-	

NOTE:

The quantize value is set ONLY when a clear pattern is called and is being set for programming, as described in the REAL TIME PATTERN PROGRAMMING and STEP WRITE PATTERN PROGRAMMING sections.

The Step Write Dot Display

To make step write programming of patterns easier and more rapid, the RX21L features a Dot Display which gives a visual indication of each instrument. This is called up as follows:

1. Enter the step write mode as usual, and set the Length and Quantize Rate as previously described. Then return the LCD to the step write mode display, and press the START key to commence step write programming.
2. Press the STEP WRITE key, and the LCD display will switch to the Dot Display.

Example: 4/4 time bar, Quantize Rate 16

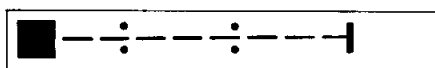
In the above example, there are 4 quarter notes to the bar, indicated by the vertical pairs of small dots. The quantize rate indicates 16 beats to the bar, each one indicated by a dash. The cursor flashes over the first dash, prompting you to enter a note or rest. As soon as you play any instrument, the dash for that beat is replaced by a Note Marker. If you enter a rest (using the +1/YES key) the dash for that beat will remain. In either case, the flashing cursor will move forward to the next beat, and you can enter another note or rest.

The Dot Display will show only the part of the instrument you have just played. Playing another instrument will immediately change the Dot Display to the one corresponding to the new instrument (with the cursor in the same relative position). When you first enter the Dot Display mode, the initial Dot Display will always be the one corresponding to Accent. You can switch the Dot Display to show the part of any instrument, without entering a note, in the following manner:

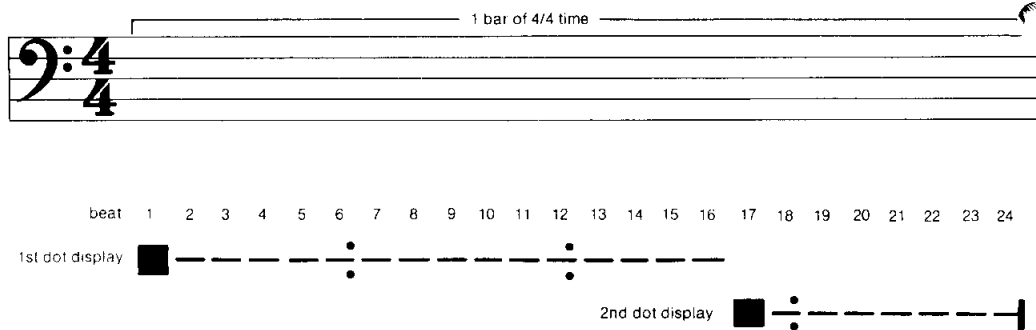
1. Hold down the TEMPO button. The name of the last instrument played will be displayed (this includes the ACCENT function as well as instrumental names).
2. To switch to another part, continue holding the TEMPO button, and press the button corresponding to the new instrument. The LCD will switch to indicate the name of the new instrument.
3. When you release the TEMPO key, the LCD will show the Dot Display corresponding to the new instrument. The cursor will NOT have moved forward, and you can now enter more notes or rests.

You can enter the Dot Display mode at any time during step write programming, as long as you have already pressed the START key. In fact, pressing the STEP WRITE button switches the RX21L between the "PTN *pp* : BEAT *bb*" (normal step write display) and the Dot Display.

The length of the Dot Display depends on two things: the length of the pattern, and the quantize rate. For example, in a 3/4 time pattern with a quantize rate of 1/12, the empty pattern will be displayed thus:



However, the LCD display only accommodates 16 beats, so in the case of a pattern with more beats (for example, a 4/4 time bar with a quantize rate of 1/24) only the first 16 beats will be displayed, initially. Then, as soon as the cursor passes the last beat to the right of the LCD, the Dot Display will switch to show the remaining beats in the bar.



Just remember that the pairs of vertical dots indicate the primary beats in each bar, and you'll find that the Dot Display is a valuable aid for programming your RX21L rapidly and accurately in the step write mode. You can exit the step write mode from the Dot Display in the usual manner, by pressing the STOP/CONTINUE key.

Dot Display (Example: Time 3/4, Quantize 1/16, on pattern 00)

- ① SELECT PTN 00 ■
- ② STEP WRITE → STEP L=12, Q=1/16
- ③ START → PTN 00 : BEAT 01
- ④ STEP WRITE → ■ — — ÷ — — ÷ — — — | (empty dot display)
- ⑤ ENTER TAMBOURINE ON FIRST BEAT
CONGA H MUTE
TAMBOURINE → ■ ■ — — ÷ — — ÷ — — — | (TAMBOURINE dot display)
- ⑥ ENTER REST ON SECOND BEAT
YES
+1 → ■ — ■ — ÷ — — ÷ — — — | (TAMBOURINE dot display)
- ⑦ ENTER CUICA HI ON THIRD BEAT
CUICA H
WHISTLE T → — — ■ ■ — — ÷ — — — | (CUICA H dot display)
- ⑧ HOLD TEMPO KEY
TEMPO → CUICA H
- ⑨ CONTINUE HOLDING TEMPO KEY. PRESS CLAVES KEY
AGOGO L
CLAVES → CLAVES
- ⑩ RELEASE TEMPO KEY → — — — ■ — — ÷ — — — | (CLAVES dot display-empty)
- ⑪ ENTER CLAVES ON 4th, 5th, 6th BEAT
AGOGO L
CLAVES PRESS 3 TIMES → — — — ■ ■ ■ — — ÷ — — — | (CLAVES dot display)
- ⑫ STOP/
CONTINUE → SELECT PTN 00 ■

You can use the Dot Display function to examine any pattern, whether programmed in real time or step write. This is a good way to learn what rhythms look like when displayed visually—you'll find that even complex rhythms quantized at 1/32 look really simple on the Dot Display.

Beat Exchange

- Once a pattern is programmed, you cannot re-program the quantize rate. However, the Beat Exchange function enables you to switch the quantize rate of an existing pattern between 1/12 and 1/24, or 1/16 and 1/32. This is done in the following manner: after selecting your pattern, press BEAT. The LCD will show "BEAT EXCHANGE ?". Pressing the +1/YES key carries out the Beat Exchange function—the LCD will switch to "BEAT EXCHANGING!", then revert to the "SELECT PTN pp" display. Alternatively, pressing the -1/NO key will cancel the Beat Exchange function.
- If you're not sure what quantize rate is set on your selected pattern, simply press REAL TIME WRITE, and the LCD will show "REAL L=//, Q=1/qq"; "qq" is the Quantize rate. If the Quantize rate is 12 (or 16) the Beat exchange will switch it to 24 (or 32), and vice versa.

- If you have selected a non-existent pattern (50-99), the LCD will show "ILLEGAL NUMBER!", and return to the "SELECT PTN pp" display.
- The Beat Exchange function is useful when programming patterns in the step write mode, as you can use a low quantize rate to enter the simpler rhythms, then use the BEAT EXCHANGE function to switch to a higher quantize rate and enter more complex rhythms. This is described in the STEP WRITE PATTERN PROGRAMMING SECTION.
- When programming in real time, you could use a low quantize rate to create an absolutely accurate basic rhythm part, then switch to a faster quantize rate for addition of a freer, more subtle rhythm part.

IMPORTANT:

If you switch from a higher quantize rate to a lower one, only the notes occurring on the new beats will remain—all other notes will be cleared. For example, if you have programmed a part at a quantize rate of 1/32, the Beat Exchange function will switch the quantize rate to 1/16, and all notes which originally appeared on beats 2, 4, 6, 8 etc. will be erased. This will affect all instruments simultaneously.

Let's look at what happens to a 2/4 time claves pattern, programmed at 1/32 quantize rate, when we perform the Beat Exchange function.

The diagram illustrates the effect of the Beat Exchange function on a 2/4 time pattern. It is divided into two parts: "QUANTIZE AT 1/32" and "BEAT EXCHANGE TO 1/16".

QUANTIZE AT 1/32: The top part shows a bass clef staff with a 2/4 time signature. The pattern consists of notes on beats 1, 3, 5, 7, 9, 11, 13, and 15. Below the staff is a "beat:" line numbered 1 to 16. The "dot display:" shows a sequence of 16 dots, with a vertical line between dots 8 and 9, and a vertical line between dots 15 and 16.

BEAT EXCHANGE TO 1/16: The bottom part shows the same bass clef staff and 2/4 time signature. The pattern now consists of notes on beats 1, 3, 5, 7, 9, 11, 13, and 15. Below the staff are two "beat:" lines: "beat (old)" numbered 1 to 16, and "beat (new)" numbered 1 to 8. The "new dot display:" shows a sequence of 16 dots, with a vertical line between dots 8 and 9, and a vertical line between dots 15 and 16. The notes on even-numbered beats (2, 4, 6, 8, 10, 12, 14, 16) are missing.

All the notes originally occurring on even-numbered beats have gone—permanently. It is safer, then, to use the Beat Exchange function for switching from a lower quantize rate to a higher one, so that you can add rhythmic subtleties rather than remove them.

Beat Exchange (Example: on pattern 00)

- ① SELECT PTN 00 ■
- ② BEAT → BEAT EXCHANGE ?
- ③ YES
+1 → BEAT EXCHANGING !
- SELECT PTN 00 ■

Click Level

You can set the level of the RX21L's click track (rhythm guide during real time recording) before or during recording. Simply press the LEVEL key twice, then the BEAT key. You can now set the click track level using the -1/NO and +1/YES keys. The available click level range is 00–31. 00 turns off the click track. When setting the level, the -1/NO and +1/YES keys can be pressed for single unit change, or held down for rapid continuous change. Note that the Click level you have set will remain, even after you turn the RX21L power off.

Setting Click Level (Example: reducing level from 31 to 20, while recording on pattern 00)

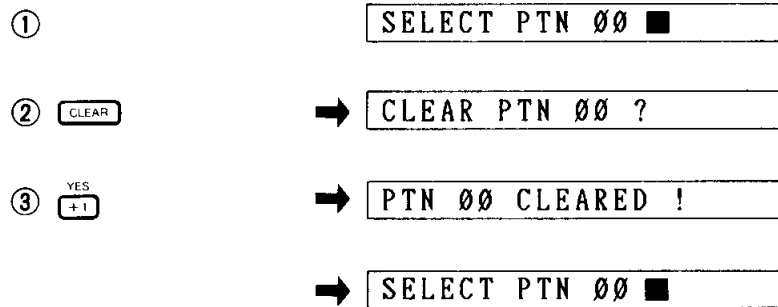
- ① PTN 00 RECORDING
- ② LEVEL → TOTAL LEVEL =tt
- ③ LEVEL → INST LEVEL
- ④ BEAT → CLICK LEVEL 31
- ⑤ NO
-1 HOLD
DOWN → CLICK LEVEL 20
- ⑥ LEVEL → PTN 00 RECORDING

Pattern Clear

Single patterns can be cleared (erased) by selecting the pattern to be cleared and first pressing the CLEAR button. The RX21L then gives you the chance to confirm your intention to clear the pattern by displaying the "CLEAR PTN pp ?" message (where "pp" is the number of the selected pattern). If you decide you don't want to clear the pattern, press the -1/NO button to cancel the clear function.

If you want to clear the pattern, press the +1/YES key. The LCD will show the "PTN pp CLEARED!" display, followed by the "SELECT PTN pp" display. If you have selected a pattern that is already clear, the LCD will switch directly back to the "SELECT PTN pp" display. If you have selected a non-existent pattern (50-99), the LCD will show "ILLEGAL NUMBER!", and return to the "SELECT PTN pp" display.

Pattern Clear (Single) (Example: clear pattern 00)



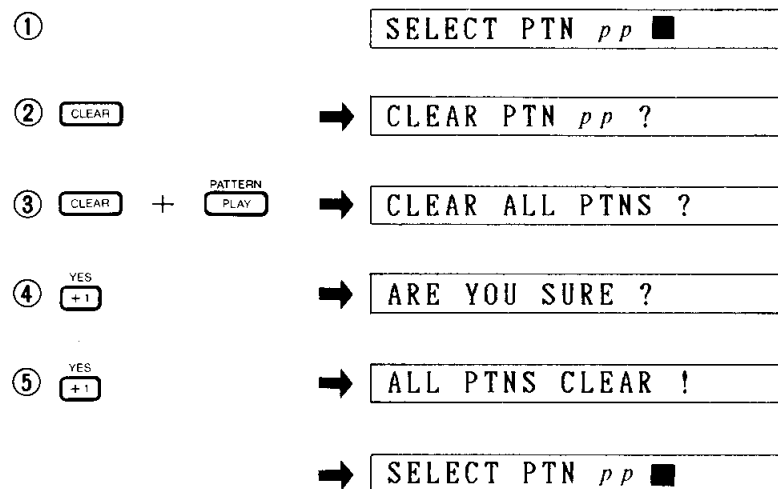
All programmable patterns in the RX21L's memory (numbers 00-49) can be cleared simultaneously if required. This is a "hidden function" in the sense that it cannot be accessed directly—in order to prevent accidental erasure of the entire memory contents.

First, press the CLEAR button from the pattern select mode (in this case, the pattern number selected is of no importance). When the "CLEAR PTN *pp* ?" display appears, simultaneously press the CLEAR and PATTERN PLAY buttons. The LCD will switch to "CLEAR ALL PTNS ?". If you decide you don't want to clear all patterns, press the -1/NO button to cancel the clear function.

If you want to clear all patterns, press the +1/YES key. The LCD will show the "ARE YOU SURE ?" display, to give you a second chance to confirm your intention to clear all patterns. Again, If you decide you don't want to clear all patterns, press the -1/NO button to cancel the clear function.

If you are sure you want to clear all patterns, press the +1/YES key. The LCD will show the "ALL PTNS CLEAR" display, followed by the "SELECT PTN *pp*" display. The "clear all patterns" function initializes (zeros) the pattern memory, and can be used to restore normal operation should an operation error cause the RX21L software to malfunction. It's advisable to save the contents of the pattern memory onto a cassette tape (see the CASSETTE OPERATIONS chapter) to prevent loss of patterns you wish to keep.

Pattern Clear (All Patterns)



(ANY PATTERN NUMBER
BETWEEN 00 AND 49
WILL DO)

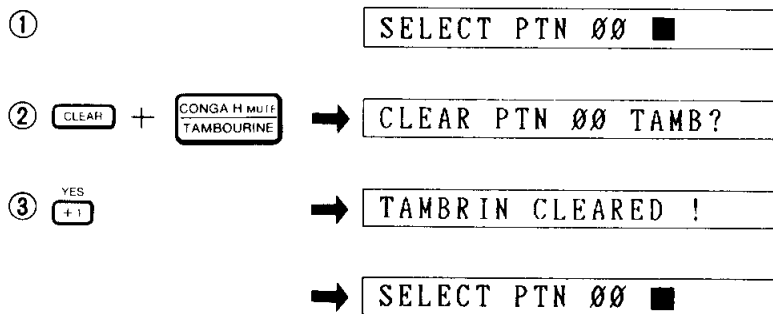
Instrument Clear

A single instrument's entire part may be immediately cleared from a pattern, when the RX21L is in the pattern select mode, holding the CLEAR button while pressing the appropriate instrument key. The LCD will show "CLEAR PT pp XXXX?" where " pp " is the selected pattern number and "XXXX" is the instrument name, abbreviated. (NOTE: you can also clear the accents from a pattern in this way, by pressing CLEAR plus ACCENT).

If you decide you don't want to clear the instrument, press the -1/NO button to cancel the clear function.

If you want to clear the instrument, press the +1/YES key. The LCD will show the "XXXXXX CLEARED!" display (where "XXXXXX" is the instrument name) followed by the "SELECT PTN pp " display. If you have selected a non-existent pattern (50-99), the LCD will show "ILLEGAL NUMBER!", and return to the "SELECT PTN pp " display.

Instrument Clear (Example: clear TAMBOURINE from pattern 00)



Pattern Copy

The RX21L allows you to copy any pattern from one pattern number to another pattern number. This is particularly handy when you want to add more instruments or rhythm lines, or otherwise alter an existing pattern, and still keep the original pattern. You can use this function to copy one of the RX21L's preset patterns, then alter it to create your own personally programmed pattern. You could also use the Copy function to arrange patterns in a predetermined sequence of patterns which will change from one pattern to the next when you press the +1/YES key (see the PATTERN CHANGE DURING PLAYBACK section).

With the RX21L in the select pattern mode, press the STEP WRITE and REAL TIME WRITE buttons simultaneously. The LCD will switch to "COPY ** to **". The cursor will be flashing to the right of the first pair of asterisks, prompting you to enter the number of the pattern you wish to copy. Enter the pattern number, using the numeric keys, and press +1/YES. The cursor will shift to the next pair of asterisks, prompting you to enter the number of the pattern you wish to copy to. Enter this number (00-49).

You can now copy the pattern by pressing +1/YES. The LCD will show "COPY EXECUTING", then revert to "SELECT PTN pp ".

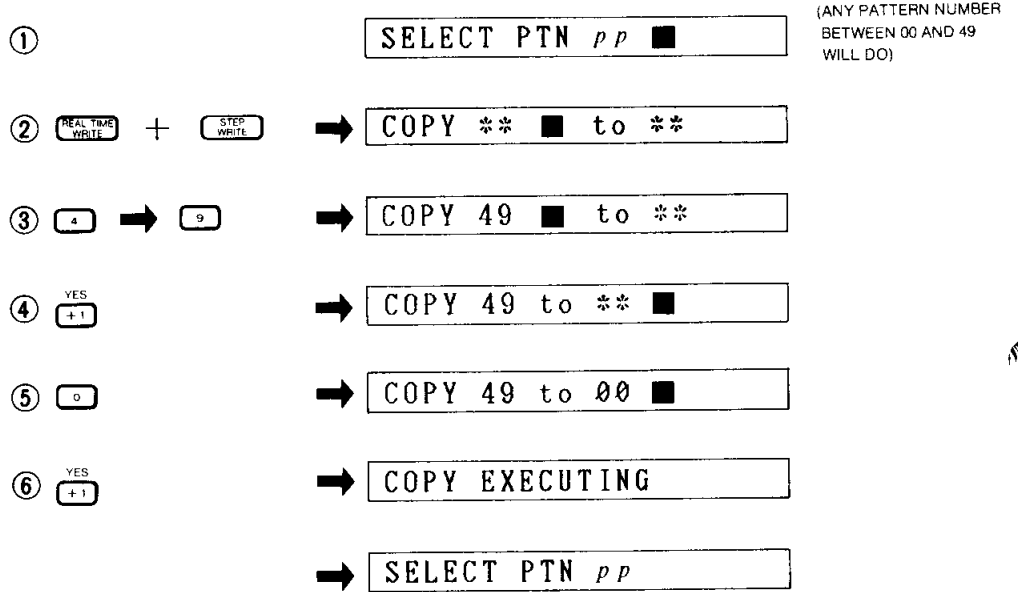
Prior to copying, you can alter the pattern numbers if you've changed your mind. Press -1/NO to move the cursor back to the first pair of asterisks, and enter a new number. Press +1/YES to move the cursor back to the second pair of asterisks, and either enter a new number or press +1/YES again to copy.

If a pattern is already programmed in the pattern number to which a pattern will be copied, the RX21L will give you a chance to confirm your intention to copy a new pattern into that location by displaying the "REWRITE PTN pp ?" message, after you have pressed the +1/YES key. If it's OK to write over the pattern, press +1/YES to execute the copy. If not, press -1/NO to cancel the copy function, and begin the copy procedure again, selecting a new pattern number on which to copy.

If you have selected a non-existent pattern (50-99), the LCD will show "ILLEGAL NUMBER!", and return to the "SELECT PTN pp" display.

Start the copy procedure again, selecting a new pattern number on which to copy. Cancelling the COPY function is done by pressing the -1/NO key: once if the cursor is next to the left hand pair of asterisks, twice if the cursor is next to the right hand pair of asterisks.

Pattern Copy (Example: Copy pattern 49 to pattern 00)



SONG OPERATIONS

In the RX21L the term "song" refers to a number of patterns connected together to form the complete rhythm track for a musical piece—for example, intro pattern, verse pattern, chorus pattern, fills, ending, etc. When used in a song, the individual patterns are referred to as "parts" of the song. The RX21L has a song memory which is separate from the pattern memory, and is capable of storing up to 4 different songs (numbered 0 through 3). The total number of parts that can be allocated to the four songs is 256 parts (i.e., 64 parts per song, or any other combination).

Song Playback

To playback a song, press the SONG PLAY button while the RX21L is in the select pattern mode (the song mode cannot be entered while a pattern is playing or being written). The LCD will show "SELECT SONG *s*" (where "*s*" is the song number, 0–3). Select a song number with the numeric keys.

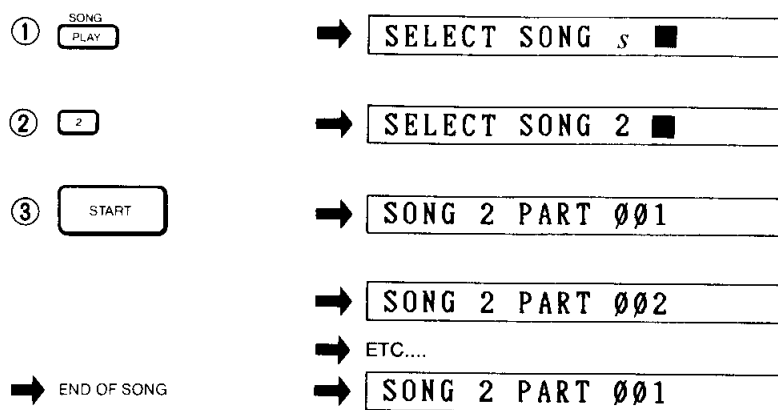
You can now play back a song in exactly the same way a pattern is played back. The START and STOP/CONTINUE buttons function in the same way as they do in the pattern mode, except that while a pattern keeps playing until you press the STOP/CONTINUE button, a song will stop automatically when the end is reached. At any time, after halting playback by pressing the STOP key, the -1/NO and +1/YES keys allow you to move backwards or forwards through the song, respectively, in the usual press-once-for-single-step or hold-down-for-continuous-movement actions. You can then playback the song from any selected point by pressing the STOP/CONTINUE key again.

If you have selected a song that contains no data, nothing will happen when you press the START key, and you should enter another song number.

During playback, the LCD will first show "SONG *s* PART 001", and the cursor will move from left to right at the bottom of the LCD. As each part is played back, it will be displayed on the LCD, until the song is finished, at which point the LCD will revert to the "SONG *s* PART 001" display. You can now play the song back again, or select another song simply by pressing the appropriate numeric key.

At any time, even during playback, you can adjust the tempo, total level, or instrument level, just as you can in the pattern mode.

Song Playback (Example: playback of song 2)

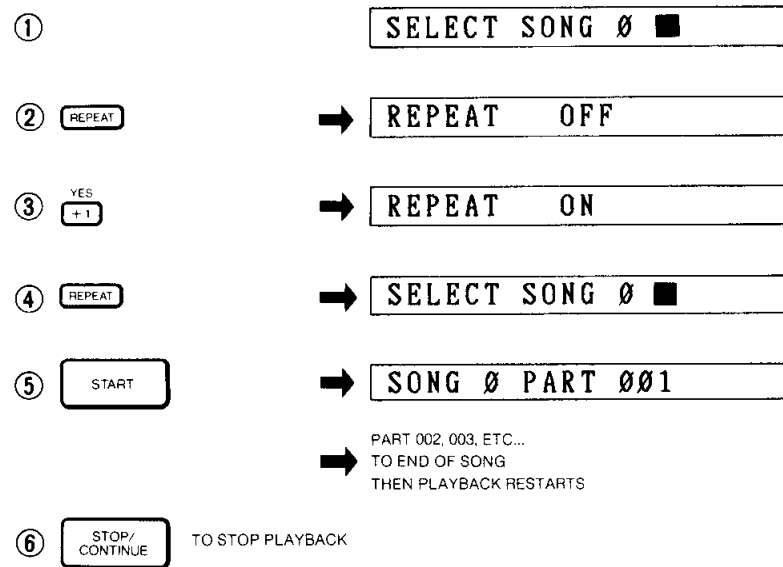


Repeat Playback of Songs

The RX21L has a useful repeat playback function. When this function is used, a song can be played back continuously, until you press the STOP/CONTINUE key. Press SONG PLAY, to enter the song mode. Now press the REPEAT key. The LCD will show "REPEAT OFF" (the repeat function is set at OFF when the RX21L is turned on). Press +1/YES to turn the repeat function on. The LCD will show "REPEAT ON". If you now press START the song that is already selected will play. If you press REPEAT, the RX21L will revert to the select song mode, and you can select another song.

The REPEAT function will now apply to playback of any song programmed into the RX21L. During repeat playback, you can of course carry out all the operations described in the SONG PLAYBACK section. Playback will continue until you press the STOP/CONTINUE key. To turn the REPEAT function OFF, simply press the REPEAT key to call up the function as previously described, and press -1/NO. The LCD will show "REPEAT OFF". Then press REPEAT again to return the LCD to its original display. This operation can even be carried out during playback, in which case the song will play through to the end, then stop. You can also turn ON the repeat function during normal playback of a song, in which case the song will then continue playing until you press STOP/CONTINUE or turn OFF the repeat function.

Repeat Playback of Song (Example: repeat playback of song 0)



Editing (Assembling a Song)

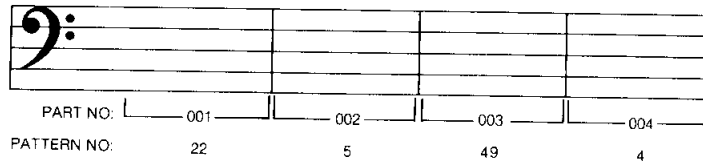
Select the song number you wish to program (0, 1, 2 or 3) then enter the edit mode by pressing the SONG WRITE key. The LCD will show "PART 001=PTN **", prompting you to enter the number of the pattern which will be used as part 1 of the song. If you have selected a song that already contains data, the asterisks will be replaced by the pattern number already programmed in. You can still enter new data in the normal manner.

Simply enter the desired pattern number and press +1/YES. The LCD will move forward to the next part ("PART 002=PTN **") and you can enter the next pattern number. This process is repeated until the last part of the song has been entered. You can enter any of the 50 patterns stored in the RX21L's memory, regardless of their time signature, so highly complex song arrangements are possible.

The RX21L's song memory is capable of storing up to 256 song parts (including repeat commands) allocated to the four songs in any combination.

Once you've entered the last part, press the SONG PLAY key. The song can now be played back in the usual manner.

While in the edit mode, the -1/NO and +1/YES keys allow you to move backwards or forwards through the song, respectively, in the usual press-once-for-single-step or hold-down-for-continuous- movement actions. Also, pressing the SONG WRITE key while in this mode sends you back to the beginning of the song instantly. At any point in the song you can replace a part simply by entering a new pattern number. Let's create a simple song consisting of four different patterns.



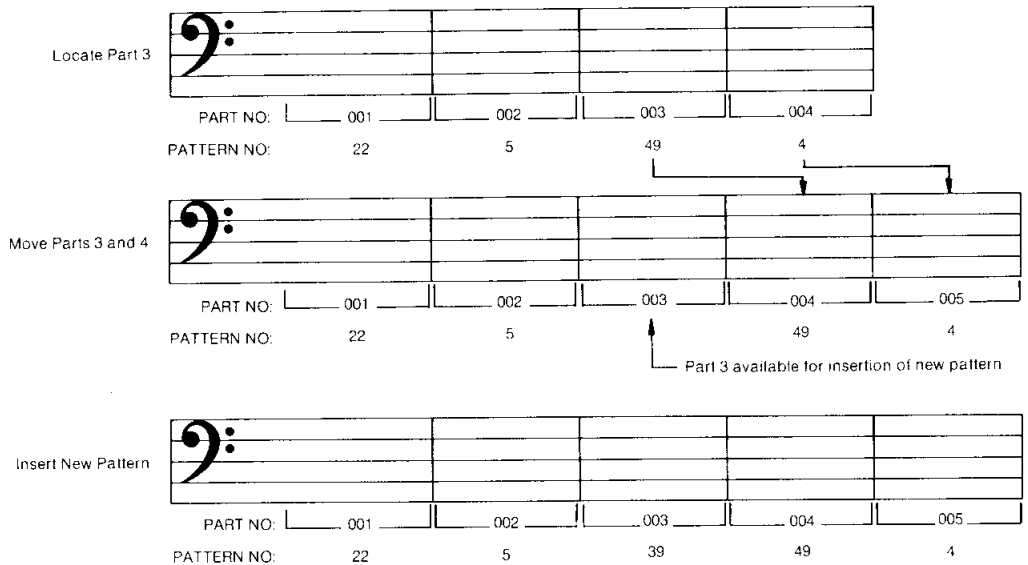
We'll use this song as a working example throughout this section of the manual.

Song Editing (Example: song 0, patterns 22,5,49,4)

- ① SELECT SONG 0 ■
- ② SONG WRITE → PART 001=PTN** ■
- ③ 2 → 2 → PART 001=PTN22 ■
- ④ YES +1 → PART 002=PTN** ■
- ⑤ 5 → PART 002=PTN05
- ⑥ YES +1 → PART 003=PTN**
- ⑦ 4 → 9 → PART 003=PTN49
- ⑧ YES +1 → PART 004=PTN**
- ⑨ 4 → PART 004=PTN04 ■
- ⑩ SONG PLAY → SELECT SONG 0

The Insert Function

While in the Edit mode, the Insert function permits new patterns to be inserted anywhere in the song, between already-programmed parts. Let's take our song example, in which we've already programmed parts 1 through 4, and add a new part between parts 2 and 3, leaving us with a total of 5 parts instead of 4. Use the -1/NO and +1/YES keys to locate part 3, which will contain the new part—the original part 3, and any subsequent parts, will be moved up by one part. Press the INSERT key. The LCD will show "INSERT PART 003?". Press +1/YES, and the current parts 3 and 4 will be moved to parts 4 and 5, leaving part 3 free for the insertion of a new pattern. The LCD will now show "PART 003=PTN **", and you can enter the new pattern simply by entering the pattern number using the numeric keys. Editing can then continue as normal. We'll enter pattern number 39.



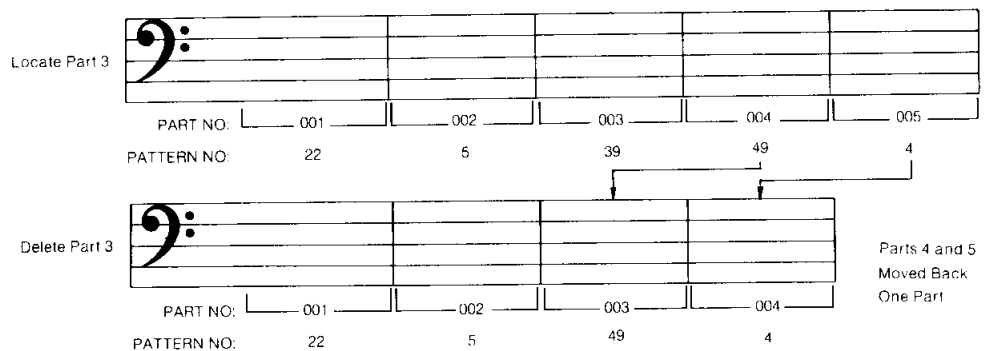
To cancel the Insert function, press -1/NO before inserting a new pattern number.

Insert (Example: insert pattern 39 between parts 2 and 3)

- ① **SONG WRITE** → PART 001=PTN22 ■
- ② **YES +1** PRESS TWICE → PART 003=PTN49 ■
- ③ **INSERT** → INSERT PART 003?
- ④ **YES +1** → PART 003=PTN** ■
(PARTS 3 AND ABOVE ALL MOVED UP ONE PART)
- ⑤ **3** → **9** → PART 003=PTN39 ■

The Delete Function

While in the edit mode, the delete function can be used to clear parts from a song program. For example, in the INSERT function described above, we inserted a new pattern into part 3. To delete this part, we simply locate part 3 using the -1/NO or +1/YES key, and press DELETE. The LCD will show "DELETE PART 003?". If we now press +1/YES, part 3 will be deleted and all subsequent parts will be moved back one part. Press -1/NO in response to the "DELETE PART 003?" message to cancel the delete function. Editing can now continue as normal.



Delete (Example: delete part 3)

- ① SONG
WRITE → PART 001=PTN22 ■
- ② YES
+1 PRESS
TWICE → PART 003=PTN39 ■
- ③ DELETE → DELETE PART 003?
- ④ YES
+1 → PART 003=PTN49 ■

You can also delete repeats within a song, without losing any parts. See the DELETING REPEATS section for an explanation of this simple procedure.

Repeats

No, nothing to do with repeat playback of songs. The RX21L has a useful repeat function enabling you to save a considerable amount of time by making it possible to repeat any part or group of parts up to 99 times. The repeat function is used in the song edit mode.

For example, to repeat parts 2 and 3 of our song 3 times (this means parts 2 and 3 would be played 4 times: 1 original plus 3 repeats) locate part 2 using the -1/NO or +1/YES keys, and press REPEAT. The LCD will then show "||: (0) or :|| (1)?", giving you the choice of inserting a Begin Repeat sign (by pressing 0) or End Repeat sign (by pressing 1). Press the 0 key to enter a Begin Repeat sign. The LCD will show "||: PART 002". Use the +1/YES key to move to part 3 and press REPEAT. This time, we want an End Repeat sign, so press the 1 key. The LCD will now show "PART 003 :|| x 01". If you only wanted a single repeat now, you could press +1/YES and the repeat would be inserted, and the LCD would display the next part (part 004). For more repeats, simply enter the number of repeats desired—a 2-digit number from 02 to 99, then press +1/YES.

We want 3 repeats, so use the numeric keys to enter "03", then press +1/YES. The repeat will be entered, and the LCD will now show the next part (part 004). You can now exit the edit mode, and when you play back the song, the repeats will occur just as you've programmed them.

Still in the editing mode, you can now use the -1/NO and +1/YES keys and locate the repeats, which are displayed just before the corresponding part (in the case of Begin Repeat signs) or just after (in the case of End Repeat signs) and once located, you can delete repeats in the same way as parts (see the DELETING REPEATS section).

You can, if you wish, repeat only one part. This is quite common—you may often want to repeat the same part, say, eight times, for a verse section, for example. In this case, having entered the Begin Repeat sign, pressing the +1/YES key will move you to the "other side" of the part in which you inserted a Begin Repeat sign, and you can enter an End Repeat sign as previously described. If you try to enter a Begin Repeat sign at a part that already has one, you'll see the "ALREADY ENTERED!" LCD message, followed by the normal editing display. The same goes for an End Repeat sign.

A number of repeats can be programmed into one song, to create complex song arrangements. This also minimizes programming time, as you can enter repeat signs instead of having to program in large numbers of individual patterns.

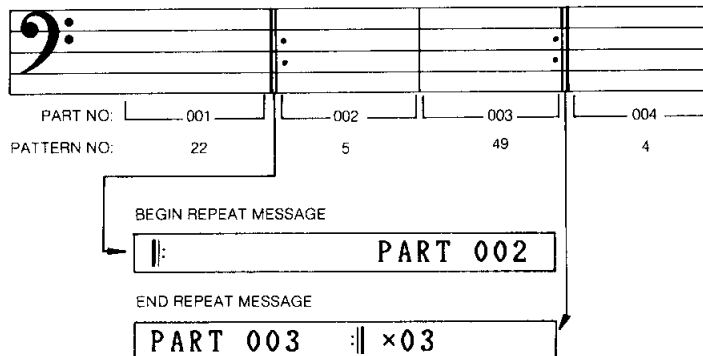
Entering Repeats (Example: repeat parts 2 and 5, 3 times)

- ① SONG
WRITE → PART 001=PTN22 ■
- ② YES
+1 → PART 002=PTN05 ■
- ③ REPEAT → || (0) or || (1) ?
- ④ 0 → || PART 002
- ⑤ YES
+1 PRESS
TWICE → PART 003=PTN49 ■
- ⑥ REPEAT → || (0) or || (1) ?
- ⑦ 1 → PART 003 || x01
- ⑧ 0 → 3 → PART 003 || x03
- ⑨ YES
+1 → PART 004=PTN04 ■

CONTINUE EDITING
AS NORMAL





Deleting Repeats

If a part contains a repeat, deleting the part will also delete the repeat. You can delete the repeat only, without deleting the part, as follows. Simply use the -1/NO and +1/YES keys to locate the repeat command, which will be displayed just before the corresponding part (in the case of Begin Repeat signs) or just after (in the case of End Repeat signs). For example, the repeats we entered into our song will be displayed as follows:



Having located the repeat sign, press DELETE, and the LCD will show "DELETE REPEAT ?", then press +1/YES to delete, or -1/NO to cancel the delete function.

Delete Repeat (Example: delete Begin Repeat at pattern 2)

- ①  → PART 001=PTN22 ■
- ②  → || PART 002
- ③  → DELETE REPEAT?
- ④  → PART 002=PTN05 ■

NOTE:





If you delete a Begin Repeat sign, the corresponding End Repeat sign will be ineffective, and vice versa. Generally, it's best to delete both repeat signs.

Song Clear

Single songs can be cleared by selecting the song to be cleared and then pressing the CLEAR key. The LCD will show "CLEAR SONG *s* ?" (where *s* is the song number). Press the +1/YES key to clear the song, and the LCD will show "SONG *s* CLEARED!" followed by the "SELECT SONG *s*" display. Press -1/NO to cancel the song clear function.

If you try to clear a song that is already clear, the LCD will revert immediately to "SELECT SONG *s*".

Song Clear (Single) (Example: clear song 0)

- ①  → SELECT SONG *s* ■
- ②  → SELECT SONG 0 ■
- ③  → CLEAR SONG 0 ?
- ④  → SONG 0 CLEARED !
- SELECT SONG 0 ■







All songs in memory (songs 0–3) may be cleared simultaneously if desired. This is a "hidden function" in the sense that it cannot be accessed directly—in order to prevent accidental clearing of the entire song memory contents.

First, press the CLEAR button from the song select mode (in this case, the song number selected is of no importance). When the "CLEAR SONG *s* ?" display appears, simultaneously press the CLEAR and SONG PLAY buttons. The LCD will switch to "CLEAR ALL SONGS?". If you decide you don't want to clear all songs, press the -1/NO button to cancel the clear function.

If you want to clear all songs, press the +1/YES key. The LCD will show the "ARE YOU SURE ?" display, to give you a second chance to confirm your intention to clear all songs. Again, if you decide you don't want to clear all songs, press the -1/NO button to cancel the clear function.

If you are sure you want to clear all songs, press the +1/YES key. The LCD will show the "ALL SONGS CLEAR" display, followed by the "SELECT SONG s" display. The "clear all songs" function initializes (zeros) the song memory, and can be used to restore normal operation should an operation error cause the RX21L software to malfunction. It's advisable to save the contents of the song memory onto a cassette tape (see the CASSETTE OPERATIONS chapter) to prevent loss of songs you wish to keep.

Song Clear (All Songs)

- ①  → SELECT SONG s ■ (ANY SONG NUMBER WILL DO)
- ②  → CLEAR SONG s ?
- ③  +  → CLEAR ALL SONGS?
- ④  → ARE YOU SURE ?
- ⑤  → ALL SONGS CLEAR!
- SELECT SONG s ■

CASSETTE OPERATIONS

Although the RX21L has a considerable amount of internal storage capacity, a cassette interface has been provided to facilitate storage on a standard cassette tape of an unlimited number of your original patterns and songs. The RX21L cassette save and load operations let you save (store onto tape) and load (transfer from tape to RX21L memory) the entire RX21L memory contents at once—all patterns and songs. Remember that when you perform a load operation the entire RX21L pattern and song memory is rewritten, erasing any data it might contain. We recommend that you use a cassette player designed specifically for personal computer data storage. If such a cassette deck is not available, however, use the highest quality unit at your disposal.

If loading problems are encountered, try adjusting the level control of the cassette player for optimum results. If your cassette player has tone controls, these may need to be adjusted as well to facilitate loading of the data. In some cases it may also be necessary to clean and demagnetize the cassette deck's reproduction heads. Before you begin a cassette operation, check that your cassette recorder is properly connected to the RX21L 8-pin DIN CASSETTE IN/OUT terminal (see "CONNECTIONS" diagram).

Save/Verify

The SAVE and VERIFY buttons permit access to two functions: 1) SAVE actually stores the data in the RX21L memory onto cassette tape, and 2) VERIFY automatically compares the data written onto the cassette with that in the RX21L memory in order to confirm that the data has been properly saved.

To begin any cassette operation, first enter the cassette control mode by pressing the CASSETTE button. The LCD will read "CASSETTE CONTROL" indicating that the cassette control mode is active. The three buttons below the CASSETTE button now function according to the name written ABOVE them, rather than the name written ON them. In other words:

REPEAT KEY becomes SAVE KEY
INSERT KEY becomes LOAD KEY
DELETE KEY becomes VERIFY KEY

To save the RX21L memory contents, first start the cassette recorder running in the record mode. Once the recorder is running, press the SAVE button. The LCD will read "SAVE EXECUTING", indicating that the data is being saved. This operation will take about 12 seconds. The LCD will then show "SAVE COMPLETED" for about 2 seconds, followed by "CASSETTE CONTROL".

To verify that the save operation was successful, stop the cassette recorder, and rewind it to the beginning of the file just saved (it's good to zero the tape counter on your cassette recorder prior to recording, so you can now simply rewind to the zero point. Also, once you've done a save operation, you'll know the characteristic high-pitched sound of saved data, and be able to rewind to the start of the data using a review control, if your recorder has one). Press the VERIFY button, and start the recorder in the playback mode. The RX21L will then compare the contents of its memory to the data saved on the tape, an operation lasting about 12 seconds. The LCD panel will read "VERIFY EXECUTING". If no data errors are encountered, the LCD panel will read "VERIFY OK", followed by "CASSETTE CONTROL". The cassette recorder can be stopped at this point.

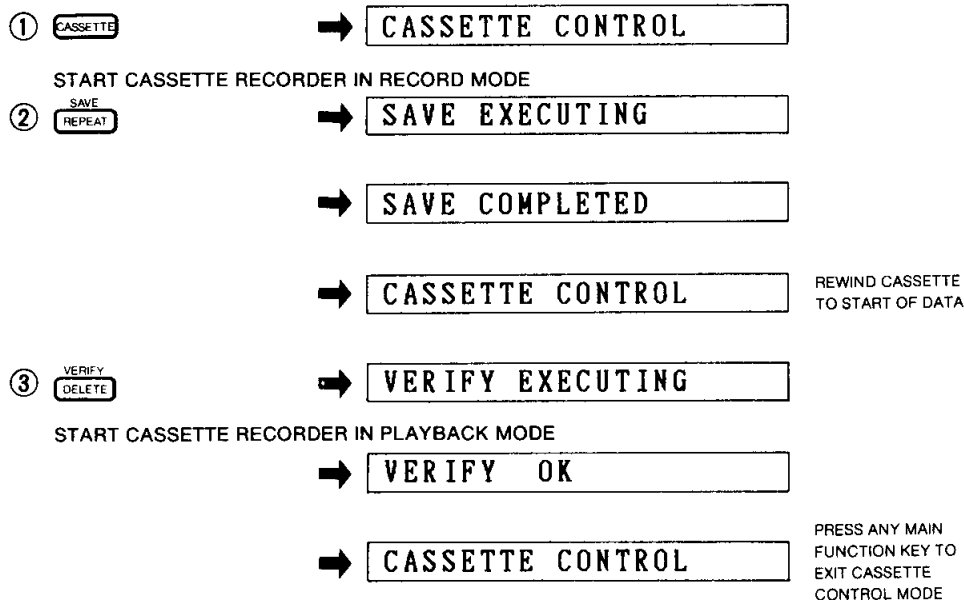
If an error is encountered, the display will read "VERIFY ERROR". If this happens, the RX21L will not function for about 2 seconds. You can then return to the cassette control mode by pressing the CASSETTE button and try saving the data again.

If you wish to stop an operation before the RX21L has completed a function, press the CASSETTE button. The LCD will read "SAVE BREAK" or "VERIFY BREAK",

depending on which function you have interrupted. The RX21L will stop for about 2 seconds, then you can return to the cassette mode by pressing CASSETTE again. The verify function can be accessed directly, without going through the save operation by pressing the VERIFY button.

The cassette control mode is exited by pressing any main function key (pattern play, beat exchange, real time write, step write, song play, song write, clear, MIDI control).

Save Data to Cassette and Verify



Load

To load data from a cassette tape into the RX21L memory, first enter the cassette control mode by pressing the CASSETTE button. When the LCD panel reads "CASSETTE CONTROL", press the LOAD button. The LCD will respond with "LOAD SURE?" Make sure that the data cassette is rewound to the beginning of the file you wish to load, press the +1/YES button then start the cassette player in the playback mode to begin the load operation. If you do not wish to load, press the -1/NO key and the LCD will revert to the "CASSETTE CONTROL" display.

While the RX21L is loading the data (about 12 seconds) the display will read "LOAD EXECUTING". If the load operation is completed and no errors are detected, the RX21L will return directly to either the song or pattern mode. If a load error is detected the LCD display will read "LOAD ERROR!" In this case return to the cassette control mode by pressing the CASSETTE button and carry out the load process again.

If you wish to stop a load operation before the RX21L has completed this function, press the CASSETTE button. The LCD will read "LOAD BREAK". The RX21L will stop for about 2 seconds, then you can return to the cassette mode by pressing CASSETTE again.

The cassette control mode is exited by pressing any main function key (pattern play, beat exchange, real time write, step write, song play, song write, clear, MIDI control).

Load Data from Cassette

① →

② →

③ START CASSETTE RECORDER IN PLAYBACK MODE

→

→ RETURNS TO ORIGINAL DISPLAY
(PATTERN PLAY OR SONG PLAY)

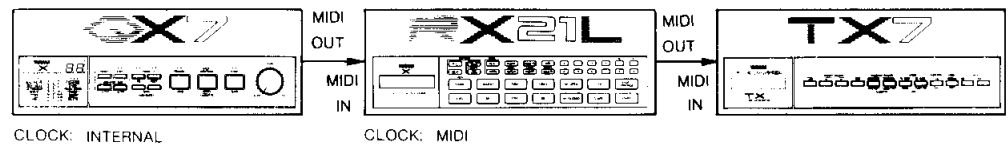
MIDI FUNCTIONS

The RX21L features MIDI (Musical Instrument Digital Interface) IN and OUT terminals on the rear panel (see the CONNECTIONS diagram for details). This means that your RX21L can control or be controlled by other MIDI instruments, so that it functions as part of a state-of-the-art digital music system, as well as a sophisticated unit in its own right. The following four basic MIDI control operations are available (read the rest of this chapter for details of these operation procedures).

1. MIDI CLOCK INPUT.

The RX21L can be synchronized to the clock of an external MIDI sequencer, rhythm programmer or music computer (such as the Yamaha QX-series sequencers, RX-series rhythm programmers or CX5M Music computer). This enables you to add realistic percussion sounds to the music programmed into your sequencer, or to add some Latin percussion to the drum kit sounds in your RX rhythm programmer. Any tempo changes will be followed by the RX21L. For this operation, set the RX21L clock to MIDI. (See page 41)

APPLICATION EXAMPLE: RX21L plus QX7 plus TX7



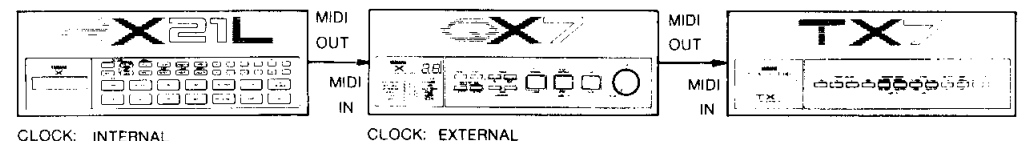
In this example, the RX21L is controlled by a QX7 Digital Sequence Recorder. The QX7 sends START and STOP controls to the RX21L, and the QX7 clock controls the tempo of the RX21L. You could either set the RX21L to PATTERN PLAY, in which case it would play continuously a selected pattern every time it receives a START signal; or you could set the RX21L to SONG PLAY, in which case it would, on receipt of a START signal, play a complete song, specially programmed to match the music data stored in the QX7.

The "echo back" feature built into the RX21L lets you output, from the MIDI OUT terminal of the RX21L, exactly the same MIDI signal received at its MIDI IN terminal. In this manner, the QX7 MIDI signal is passed on to control a TX7 Tone Generator, which generates instrumental sounds identical to a DX7 synthesizer.

2. MIDI CLOCK OUTPUT.

External sequencers or music computers can be synchronized to the RX21L's internal clock. This enables you not only to start and stop sequencers from the RX21L, but also to control their tempo. For this operation, set the RX21L clock to INTERNAL.

APPLICATION EXAMPLE: RX21L plus QX7 plus TX7

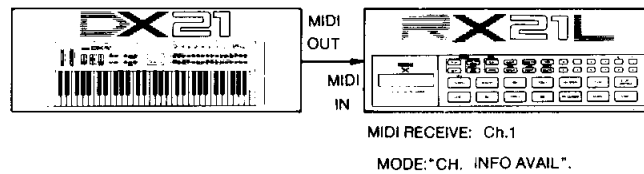


In this example, which in effect has the same sound potential as the previous one, the RX21L controls the QX7 which in turn controls a TX7. It outputs STOP and START signals, and the MIDI Clock signal, which will control the tempo of the QX7, which has its clock set to EXTERNAL.

3. KEY NUMBER RECEPTION.

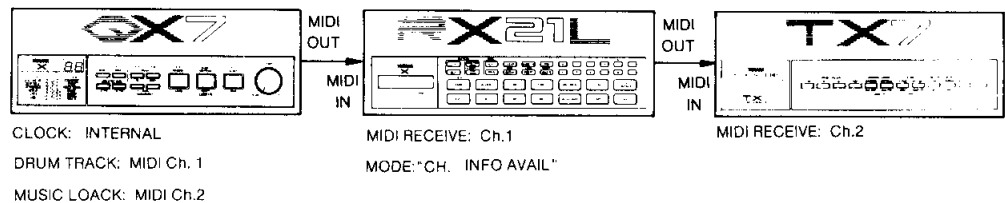
The RX21L instruments can be sequenced by an external sequencer or music computer, or played by an external synthesizer. In this case, patterns are not used—the instruments are “played” by the external instrument, just as if you were playing on the instrument buttons. For this operation, set the RX21L to CHANNEL INFORMATION AVAILABLE and its MIDI Receive Channel to the same number as the MIDI Transmit Channel of the external MIDI device.

APPLICATION EXAMPLE 1: RX21L plus DX21



In this example, the instruments of the RX21L are played by the DX21. The MIDI key numbers corresponding to the RX21L instruments mean that you will play the RX21L from the left hand end of the DX21 keyboard. (See page 42) You could set your DX21 to KEYBOARD SPLIT, with the balance adjusted so that no sound is output from the left hand section of the keyboard. In this way, your left hand plays only the RX21L, while your right hand plays a melody on the right hand section of the DX21 keyboard.

APPLICATION EXAMPLE 2: QX7 plus RX21L plus TX7



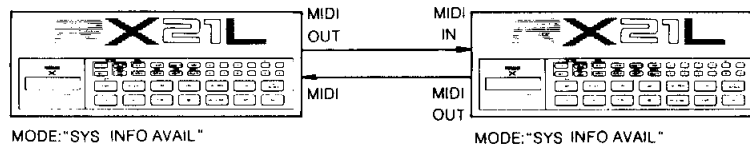
In this example, the QX7 sends Key Number data to the RX21L. The QX7, is programmed with a “percussion track”, using only the pitches corresponding to the RX21L instruments (see CHANNEL INFORMATION AVAILABLE, on the pages 42 and 43, for details of these pitches) and including a MIDI Channel number to which the RX21L is matched.

The “echo back” feature is used again here, so that the QX7 MIDI signal is passed on to control the TX7 Tone Generator. The track of data in the QX7 which is intended to control the TX7, should have a different MIDI channel than the “percussion track”, and the TX7 should be set to receive data on this MIDI channel number.

4. MIDI DATA TRANSMIT.

You can send, in MIDI data form, the entire pattern memory and song memory contents from one RX21L to another, in an extremely rapid and simple operation. For this operation, set both RX21L's to SYSTEM INFORMATION AVAILABLE.

APPLICATION EXAMPLE: 2 RX21L's.



In this example, the left hand RX21L sends MIDI data to the right hand RX21L, as described later in this chapter. Whichever way you wish to send data, the connections should be made as shown.

Clock Modes

The RX21L offers two clock modes (also known as sync modes or synchronization modes) which function as follows:

1. INTERNAL.

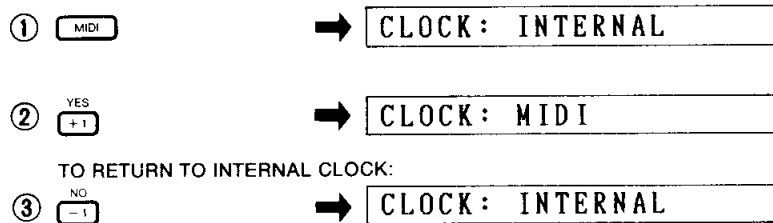
This is the normal RX21L mode. The playback of patterns and songs is synchronized to the RX21L's own internal clock, the speed of which is adjusted by the TEMPO control. The internal mode is also used when external sequencers or rhythm machines are to be synchronized to the RX21L's internal clock, which is transmitted via the MIDI OUT connector.

2. MIDI.

In this mode the playback of patterns and songs is synchronized to a MIDI clock signal received from an external sequencer, music computer or another rhythm machine, via the MIDI IN connector on the RX21L rear panel. In this case the tempo is controlled by the device which is transmitting the MIDI clock signal.

The desired clock mode is selected by pressing the MIDI button. Normally, the LCD will read "CLOCK: INTERNAL", indicating that the internal clock mode is selected. To select the external clock mode, press the +1/YES button. "CLOCK: MIDI" will appear on the LCD. If you wish to switch back to "CLOCK: INTERNAL", press the -1/NO button. Once the selection has been made, press any other main function key to exit. If you turn the RX21L power off, the next time you turn it on again, the internal clock mode will be selected.

Clock Mode Selection



MIDI Parameters

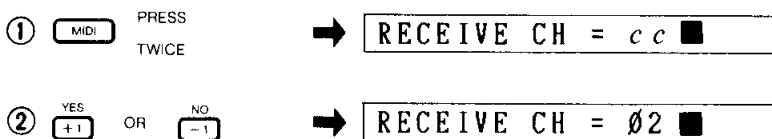
The following parameters must be set, in order to carry out the various MIDI control operations that we've just discussed.

1. RECEIVE CHANNEL (1 through 16)

MIDI information is transmitted on 16 channels, and for key number reception, the RX21L must be set to the same MIDI channel as the MIDI instrument(s) to which it is connected. The sequencer or music computer used to transmit the MIDI data might, for example, be transmitting melody data to a synthesizer on channel 1, and rhythm data to the RX21L on channel 2. The RX21L must therefore be set to receive on channel 2, to prevent the melody data from triggering the rhythm machine.

To set the channel number, press the MIDI button twice. "RECEIVE CH=cc" will appear on the LCD ("cc" being the channel number). To change the channel number, press the +1/YES button to increase the number and -1/NO button to decrease it. To exit this mode, press any main function key. The MIDI Receive Channel that you have selected will remain even after the RX21L power is turned off.

MIDI Receive Channel Setting (Example: set to channel 2)



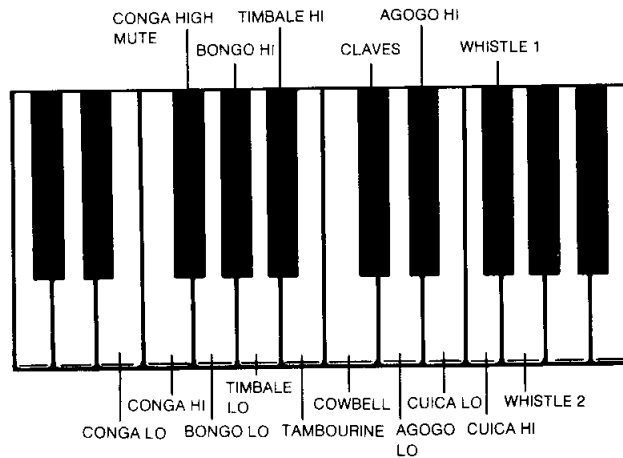
2. CHANNEL INFORMATION AVAILABLE

In this mode, the RX21L receives MIDI key number data from an external source, as described in KEY NUMBER RECEPTION at the beginning of this chapter. A key number corresponds to the number (pitch) of a key played on a synthesizer keyboard. Middle C, for example, is MIDI key number 60. A MIDI sequencer, for example, outputs key numbers to a keyboard, causing the synthesizer to play the corresponding notes.

The RX21L has 16 different instrument sounds. Each of these has been assigned a MIDI key number between 64 (E3) and 79 (G4). These are as follows:

Note	E3	F3	F#3	G3	G#3	A4	A#4	B4	C4	C#4	D4	D#4	E4	F4	F#4	G4
MIDI KEY NUMBER	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
INSTRUMENT	CONGA LO	CONGA H OPEN	CONGA H MUTE	BONGO L	BONGO H	TIMBALE L	TIMBALE H	TAMBOURINE	CLAVES	COWBELL	AGOGO L	AGOGO H	CUICA L	CUICA H	WHISTLE 1	WHISTLE 2

A key number transmitted by any MIDI synthesizer, sequencer or music computer will activate any RX21L instrument. For example, you can manually "play" the RX21L "percussion sounds" on a MIDI keyboard:



You could also program a series of key numbers into your computer or sequencer (like programming in a "melody" composed of the "pitches" corresponding to the RX21L instruments, as shown in the above diagrams). The sequencer/computer will cause the RX21L to perform rhythms or complex sequences, when you start playback of the programmed sequence.

To engage this mode, press the MIDI button three times. The LCD panel will show "CH INFO AVAIL". You can now play the RX21L from an external MIDI source. This mode is active only while the LCD shows "CH INFO AVAIL". To exit this mode, press any other main function button.

Key Number Reception



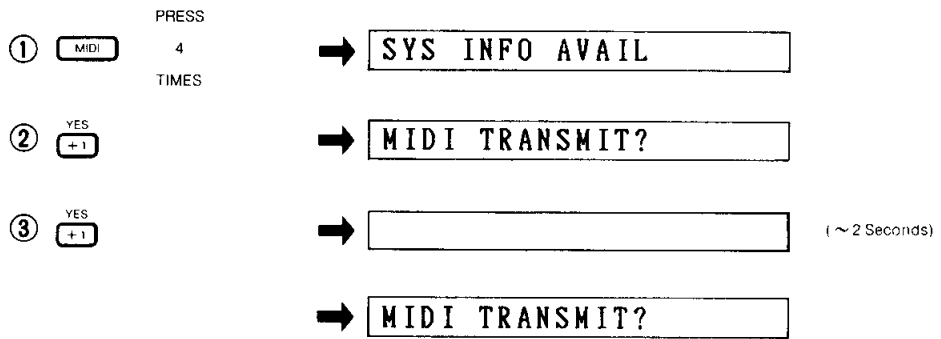
3. SYSTEM INFORMATION AVAILABLE

In this mode, the RX21L can send or receive the entire contents of pattern and song memories, in the form of MIDI data, to or from another RX21L. This means that, without having to use cassette save/load operations, you can quickly and easily transfer an enormous amount of pattern/song data.

To engage this mode, press the MIDI button four times, on both RX21L's. The LCD's will show "SYS INFO AVAIL". You can now either receive or transmit MIDI data. To send data, press the +1/YES button on the RX21L that will transmit data. Its LCD will read "MIDI TRANSMIT?". Press the +1/YES button a second time to transmit data. Press -1/NO to cancel the MIDI transmit function and return the LCD to "SYS INFO AVAIL".

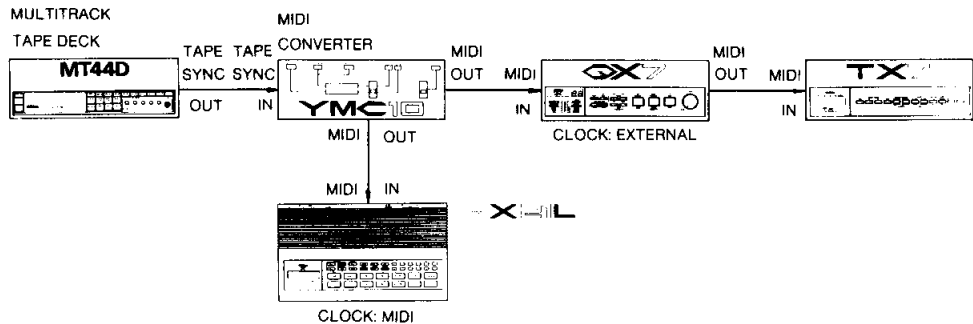
During transmission, the transmitting RX21L's LCD will go blank for a few seconds while data is transmitted. It will then revert to the "MIDI TRANSMIT ?" display. The receiving RX21L will have its memory erased and replaced by data from the transmitting RX21L, and its LCD will change to "MIDI RECEIVED !". To exit this mode, press any other function button.

Transmitting MIDI Data



Tape Sync with the RX21L

The RX21L can function as part of a tape sync setup, where digital impulses recorded on tape can be used to control MIDI instruments for a Total Auto-Play system. In the example illustrated, the tape sync signal is recorded on track 1 of a four-track cassette using a Yamaha MT44D multitrack tape deck. This sync signal is then sent to a Yamaha YMC10 MIDI Converter, which converts the signal back into normal MIDI signals, which can then be used to control the RX21L, QX7 and TX7. The tape sync signal contains START and STOP signals, and sets the Clock Rate of both the RX21L and the QX7. The RX21L and QX7 clock should be set to MIDI. The other three tracks of the cassette tape contain recorded instruments or vocals. In this way, the two worlds of acoustic and digital music are brought together as never before, in this unique system designed by Yamaha. Simply by pressing the PLAY button on the MT44D, the pre-recorded tracks are heard, the RX21L starts to play, and the QX7 commences to generate your own digitally programmed music via the TX7. For further explanation, see the appropriate owners manuals, and the Yamaha Multitrack Guidebook.



SPECIFICATIONS

SOUND SOURCE

ROM: 256 KBIT WAVE ROMx3
NO. OF VOICES: 16

MEMORY CAPACITY

NO. OF PATTERNS: 50 programmable (00-49)
NO. OF SONGS: 4
MAXIMUM NO. OF PARTS WITHIN SONGS: 256

CONTROLLERS

- BUTTONS
TEMPO, LEVEL, ACCENT, BONGO H/TIMBALE H, BONGO L/TIMBALE L, AGOGO H/COWBELL, AGOGO L/CLAVES, CONGA H MUTE/TAMBOURINE, CONGA H OPEN, CONGA L, CUICA H/WHISTLE 1, CUICA L/WHISTLE 2, START, STOP/CONTINUE PATTERN KEYS (PLAY, BEAT, REAL TIME WRITE, STEP WRITE) SONG KEYS (PLAY, WRITE, INSERT, DELETE, REPEAT) CLEAR, CASSETTE, MIDI
 - SWITCH
POWER SWITCH
-

DISPLAY

LCD: 16 CHARACTERS

CONNECTION TERMINALS AND INTERFACES

- AUDIO OUTPUT: OUTPUT L&R (phone jack), OR MONO (L only) PHONES (stereo phone jack 8-40 ohms)
 - INTERFACE: CASSETTE (IN/OUT) MIDI (IN, OUT)
-

DIMENSIONS AND WEIGHT

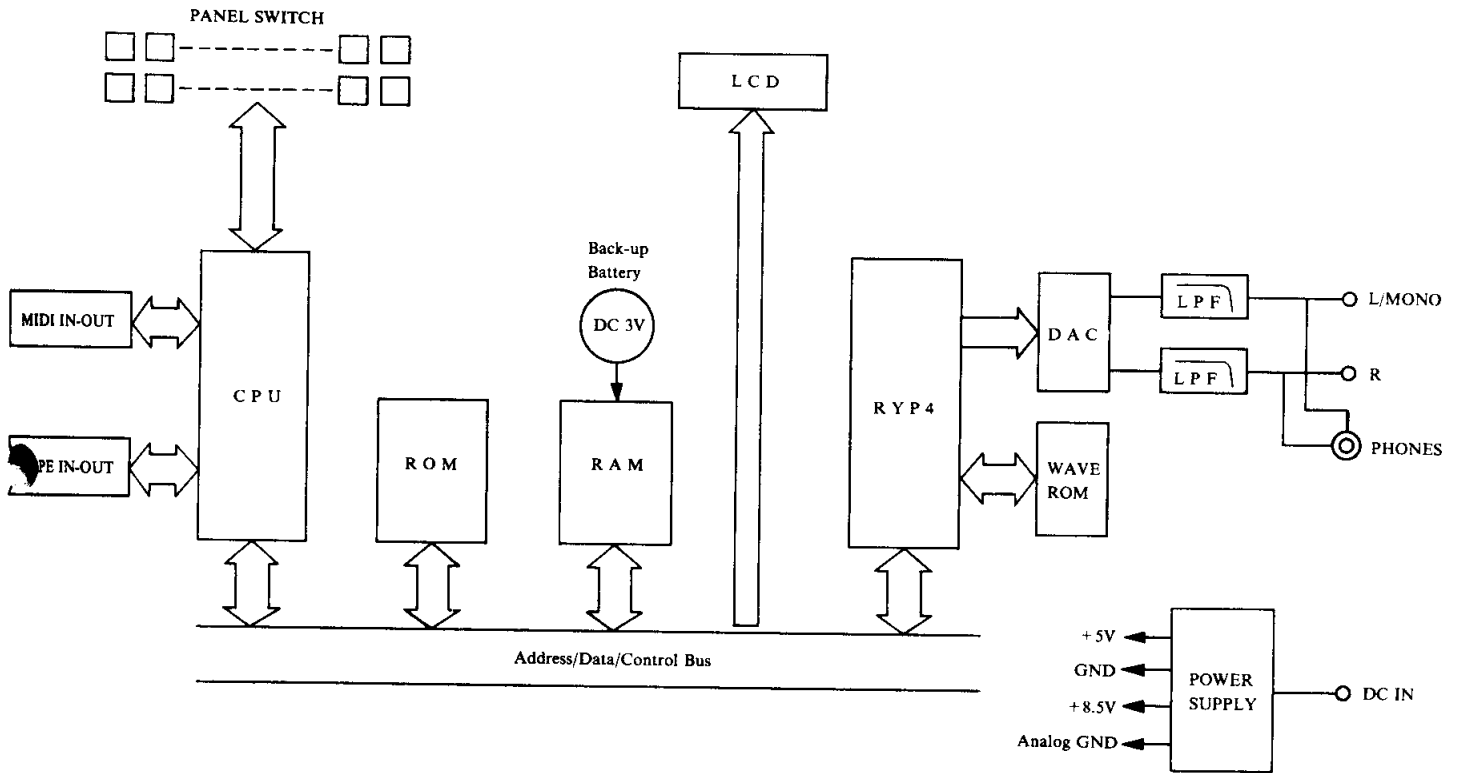
- 350Wx56Hx203D(mm) (13-25/32"x2-13/64"x8")
 - 1.3kg (2lb 14oz)
-

POWER REQUIREMENTS

9-12V
(Supplied PA-1 AC adaptor converts standard AC voltages to 12V 300 mA)

SPECIFICATIONS ARE LIABLE TO CHANGE WITHOUT NOTICE

BLOCK DIAGRAM



Function ...	Transmitted	Recognized	Remarks
Basic Default	x	1 - 16	memorized
Channel Changed	x	1 - 16	
Mode Default	x	3	
Mode Messages	x	x	
Mode Altered	XXXXXXXXXXXXXXXXXX	x	
Note Number : True voice	x XXXXXXXXXXXXXXXXXX	64 - 79 64 - 79	X1 X1
Velocity Note ON	x	o v=1-127	
Velocity Note OFF	x	x	
After Key's	x	x	
Touch Ch's	x	x	
Pitch Bender	x	x	
Control Change	x	x	
Prog Change : True #	x XXXXXXXXXXXXXXXXXX	x x	
System Exclusive	o	o	X2 : Pattern, Song
System : Song Pos	x	o	
System : Song Sel	o 0 - 3	o 0 - 3	
Common : Tune	x	x	
System : Clock	o	o (MIDI mode)	
Real Time : Commands	o	o	
Aux : Local ON/OFF	x	x	
Aux : All Notes OFF	x	x	
Mes- : Active Sense	x	x	
sages:Reset	x	x	
Notes: All messages except System Exclusive are bypassed to MIDI OUT.			
X1 = Note number 64 - 79 which correspond to each instrument			
are recognized only in CH INFO AVAIL.			
X2 = System Exclusive messages are received in SYS INFO AVAIL.			

Mode 1 : OMNI ON, POLY Mode 2 : OMNI ON, MONO o : Yes
 Mode 3 : OMNI OFF, POLY Mode 4 : OMNI OFF, MONO x : No

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