How to Effectively Edit and Use Custom Registrations on the Roland FP-60 and FP-90

19 June 2018 by the Old Bald Geek

The editable Registrations on the Roland FP-60 and FP-90 can be very handy, but
- they are a pain to edit using the buttons on the piano
- once you select a Registration, some built-in Tones may not behave the same way as before

This document addresses both issues.

This document is based on tests with my FP-90 running software version 1.50. If you get different results on your piano, please let me know what model and software version you have. The software version of your piano is shown by Function 37, "Version."

Editing Registrations on a Computer

You can save the piano's current sound, including Tone, single/split/dual mode, ambience, volume, transpose, touch setting, pedal options, and microphone settings to a Registration using the procedure "Saving Current Settings into a Registration" in the Owner's Manual.

This works, but unless you spent a lot of time in video arcades in the mid 1980s, editing the name of the Registration one character at a time is a real pain.

You can export the current set of 30 Registrations to a USB drive by using Function 24, "Reg. Set Export", and import a set of Registrations from a USB drive by using Function 25, "Reg. Set Import."

If you save a set of Registrations to a USB drive, and then plug the drive into a computer, you will find a file with a name like "REG__001.UPG", or whatever name you used when you saved the Registrations.

If you open the file with Microsoft Notepad, you will see a jumble of text. This is because the file has "Linux line endings", with a line-feed (AKA newline) at the end of each line; while Notepad wants "Windows (or DOS) line endings" with both carriage-return and line-feed at the end of each line.

Many text editors, free and otherwise, can handle the Linux line endings. Notepad2 and Notepad++ are both good choices, but there are hundreds of others. And on May 8 2018, Microsoft announced that the version of Notepad included in a future release of Windows 10 *will* support Linux line endings, only 25 years later than everyone else. If you open the file using such an editor, you will see something like this:

```
{
    "title": "PianoRegistration",
    "formatVersion": 2,
    "registrationPedalShift": 0,
    "registration": [
        {
            "name": "ConcertPiano",
            "ambience": 2,
            "keyTouch": 50,
            "keyTranspose": 0,
            "songTranspose": 0,
```

```
        "keyboardMode": 0,
        "singleToneMSB": 0,
        "singleToneLSB": 68,
        "singleTonePC": 0,
   ...

        "registrationBankMSB": 0,
        "registrationBankLSB": 0,
        "registrationPC": 0
     }
   ]
}
```

If you are geek like me, you might recognize this as JSON format.

If you edit the file on your computer, and import the file on the piano, you can quickly change a set of Registrations. I would recommend that you keep REG__001.UPG around unchanged, in case you need to or want to return to factory values.

Note that the file has exactly 1447 lines: 5 lines of header, 30 sets of 48 lines, one for each Registration, and two final lines. Before you save your changes, make sure that you have exactly 1447 lines.

If you mangle the file by omitting a line, missing a quotation mark etc., the piano may show "Error 14" when you try to import it. It can be useful to open the original REG__001.UPG and your edited file and place them side by side to check for differences. Or use a diff utility to compare the files.

The Meanings of the Registration Lines

In this section, we describe each line of a Registration, showing where it comes from if you create the Registration on the piano, and some information about the range and purpose of the setting.

"name": "ConcertPiano",
> As entered when the Registration is saved. Twelve or fewer characters from the ASCII character set (A through Z; a through z; 0 through 9; the symbols ! ? & $ \ # @ + - * / % = . , ' " : ; ( ) [ ] { } < > ^ _ ` ~ and space.) The ampersand (&) is rather odd looking on the piano's LCD. If you specify more than twelve characters, only the first twelve will be used.
>
> Shown on the LCD when the Registration is selected.

"ambience": 2,
> Value of Ambience when the Registration is saved. 0 (none) to 10 (large space).
>
> When a Registration is selected, a value based on **ambience** is transmitted using CC 91 (Effect 1 Depth) on MIDI channels **midiTxCh**, 3, and 6. The value is scaled so that an **ambience** value of 10 transmits a MIDI CC value of 127.

"keyTouch": 50,
> Value of Function 1, "Key Touch", when the Registration is saved. 0 (fixed) to 100.

"keyTranspose": 0,

Value of Transpose, "Kbd Transpose" when the Registration is saved. -6 to +5.

This setting also transposes MIDI note messages sent by the keyboard.

"songTranspose": 0,
Value of Transpose, "Song Transpose" when the Registration is saved. -12 to +12.

"keyboardMode": 0,
Value of Single/Split/Dual mode when the Registration is saved. 0 = single, 1 = split, 2 = dual.

"singleToneMSB": 0,
"singleToneLSB": 68,
"singleTonePC": 0,
Bank and Program Number of the current Tone when the Registration is saved. If "Split" mode is active, then this is "Right Tone". If "Dual" mode is active, this is "Tone 1".

You can look up the bank and program numbers in the document "FP-90 / FP-60 MIDI Implementation", available on the Roland website. Because of the way MIDI defines program numbers, the number you enter for **singleTonePC** must be one less than the value shown in the "PC" column of the Tone List. Thus, "Concert Piano" is shown in the document as MSB = 0, LSB = 68, PC = 1. It appears in the UPG file as 0, 68, 0 (see above).

When a Registration is selected, these values are transmitted on the MIDI channel specified by **midiTxCh** as CC 0, CC 12, and PC.

"splitLowerToneMSB": 0,
"splitLowerToneLSB": 67,
"splitLowerTonePC": 32,
Value of "Split - Left Tone" when the Registration is saved.

See the explanation for **singleToneMSB** above to see how to determine these values. The 0, 67, 32 shown here is "Ac.Bass wRel": MSB = 0, LSB = 67, PC = 33.

When a Registration is selected, these values are transmitted on MIDI channel 3 as CC 0, CC 12, and PC.

"splitOctaveShift": 0,
Value of "Split - Left Shift" when the Registration is saved.

This setting also transposes MIDI note messages transmitted by the keyboard.

"splitUpperOctaveShift": 0,
Value of "Split - Right Shift" when the Registration is saved.

This setting also transposes MIDI note messages transmitted by the keyboard.

"splitPoint": 54,
Value of "Split - Point" when the Registration is saved. This is a MIDI note number. Middle C (C4) is MIDI note number 60. The split point in the factory Registrations is 54, which corresponds to F#3, the F-sharp below middle C.

"splitBalance": 0,

> I don't know what this does. It is 0 in all the default Registrations.
> I can imagine some usefulness in being able to pan left and right Tones between the speakers. But I changed **splitBalance** to -5 and +5 and couldn't hear any difference.

"dualTone2MSB": 1,
"dualTone2LSB": 67,
"dualTone2PC": 49,

> Dual: as selected for Tone 2 when the Registration is saved.
>
> See the explanation for **singleToneMSB** above to see how to determine these values. The 1, 67, 49 shown here is "SymphonicStr1": MSB = 1, LSB = 67, PC = 50.
>
> When a Registration is selected, these values are transmitted on MIDI channel 6 as CC 0, CC12, and PC.

"dualOctaveShift": 0,

> Value of "Dual - Tone2 Shift" when the Registration is saved.
>
> This setting also transposes MIDI note messages sent by the keyboard.

"dualTone1OctaveShift": 0,

> Value of "Dual - Tone1 Shift" when the Registration is saved.
>
> This setting also transposes MIDI note messages sent by the keyboard.

"dualBalance": -5,

> As with **splitBalance**, I don't know what this does. It is -5 in all the default Registrations.

"twinPianoMode": 1,

> I don't know what this does. It is 1 in all the default Registrations. The FP-30 has something called "twin mode" that splits the keyboard in two, each with a middle C, in order to let two people play duets in the same pitch range. There is no mention of such a thing in the FP-90 manual, and my tests found no effect when this value was changed.

"damperPedalPart": 0,

> Value of Function 18, "Damper Pedal Part", when the Registration is saved. 0 = both, 1 = right/Tone1, 2 = left/Tone2.

"centerPedalFunc": 0,

> Value of Function 19, "Center Pedal", when the Registration is saved.
> 0   Sustenuto (standard piano function). Also sends CC 66 when the pedal is pressed.
> 1   Play/stop switch. Start and stop recorded songs.
> 2   Layer. An analog pedal like the DP-10 will control the volume of dual Tone 2 and send CC 11 on MIDI channel 6.
> 3   Expression. An analog pedal will affect the volume of all Tones. Also sends MIDI CC 11.
> 4   Master expression. An analog pedal will affect the volume of all Tones, but sends no MIDI.
> 5   Bend up (analog). Also transmits MIDI pitch bend.
> 6   Bend down (analog). Also transmits MIDI pitch bend.
> 7   Modulation (analog). Controls vibrato on most Tones. Also sends MIDI CC 1.

8 Microphone double switch
9 Microphone echo switch
10 Rotary on/off. A toggle which affects only certain organ Tones. Also sends MIDI CC 12 with value 0 for off and 127 for on on alternate presses.

"leftPedalFunc": 0,
Value of Function 21, "Left Pedal", when the Registration is saved.
0 Soft (standard piano function). Also sends CC 67.
1 1   Play/stop switch. Start and stop recorded songs.
2 Layer. An analog pedal like the DP-10 will control the volume of dual Tone 2 and send CC 11 on MIDI channel 6.
3 Expression. An analog pedal will affect the volume of all Tones. Also sends MIDI CC 11.
4 Master expression. An analog pedal will affect the volume of all Tones, but sends no MIDI.
5 Bend up (analog). Also transmits MIDI pitch bend.
6 Bend down (analog). Also transmits MIDI pitch bend.
7 Modulation (analog). Controls vibrato on most Tones. Also sends MIDI CC 1.
8 Microphone double switch
9 Microphone echo switch
10 Rotary on/off. A toggle which affects only certain organ Tones. Also sends MIDI CC 12 with value 0 for off and 127 for on on alternate presses.

"midiTxCh": 1,
Value of Function 31, "MIDI Transmit Ch.", when the Registration is saved. 0 = off, 1 to 16.

This value specifies the channel used to send MIDI messages about the single Tone, the right Tone of a split, or Tone 1 of a dual. The left Tone of a split always sends on MIDI channel 3, and Tone 2 of a dual always sends on MIDI channel 6 regardless of the value of **midiTxCh**.

"rotarySpeed": 0,
0 (off) or 1 (on). This sets the initial value of the rotary speaker effect on or off. The speed seems to be fixed, so the name isn't really accurate. It operates only on certain of the electronic Organ voices.

When a Registration is selected that allows this effect, transmits a value of 0 or 127 on MIDI CC12.

If you have one of the electronic organ Tones selected, you can toggle this value by pressing "Organ" again. But the button toggle doesn't work in Registration mode.

If the center or left pedal is assigned to pedal function 10 ("Rotary"), you can toggle the effect on and off with the pedal, using this Registration setting to set the initial value.

"modulationSpeed": 0,
The effect of this value differs for different Tones. For example:
• Tremolo on some Electric Pianos
• Detune/chorus on some Electric Pianos
• Wah-wah speed on the Clavinet

You can change this value on the piano by holding the current Tone button (Piano, Electric Piano, etc.), and pressing the metronome slow and fast buttons. The adjusted value is shown on the LCD. You can use this to determine whether or not a given Tone allows a modulation effect: if it doesn't, pressing the

buttons won't show a modulation value.

Rather oddly given the name, **modulationSpeed** *is not* affected by MIDI CC1 (modulation). Instead, you can change it by sending MIDI CC12 (Effect 1) to the piano. However, received CC12 affects *all* channels, which seems to be a bug, or at least undesirable on a multi-timbral instrument like this one.

"upperVolume": 100,
Setting of the "Upper" Part fader when the Registration is saved.

Note that when you select a Registration, this value overrides the position of the Upper Part fader and sets the volume of the part. If you subsequently move the fader, the new fader value will be used.

When a Registration is selected, transmits MIDI CC7 on the channel specified by **midiTxCh**.

"lowerVolume": 100,
Setting of the "Lower" Part fader when the Registration is saved.

Note that when you select a Registration, this value overrides the position of the Lower Part fader and sets the volume of the part. If you subsequently move the fader, the new fader value will be used.

When a Registration is selected, transmits MIDI CC7 on channel 3 and 6.

"micCompSw": 0,
Value of Mic Effects: Comp. when the Registration is saved. 0 = off, 1 = on.

"micCompType": 1,
Value of Mic Comp Type when the Registration is saved. 0 = soft, 1 = normal, 2 = hard.

"micDoublingSw": 0,
Value of Mic Effects: Doubling when the Registration is saved. 0 = off, 1 = on.

Can be controlled by pedal function 8 (microphone double switch).

"micDoublingType": 0,
Value of Mic Doubling Type when the Registration is saved. 1 or 2 voices.

"micDoublingWidth": 1,
Value of Mic Doubling Width when the Registration is saved. light, normal, deep.

"micDoublingLevel": 10,
Value of Mic Doubling Level when the Registration is saved. 0 to 10.

"micEchoSw": 0,
Value of Mic Effects: Echo when the Registration is saved. 0 = off, 1 = on.

Can be controlled by pedal function 9 (microphone echo switch).

"micEchoType": 0,
Value of Mic Echo Type when the Registration is saved. 0 to 7.

"micEchoLevel": 5,
> Value of Mic Echo Level when the Registration is saved. 0 to 10.

"centerPedalPart": 0,
> Value of Function 20, "Center Pedal Part", when the Registration is saved. 0 = both, 1 = right/Tone1, 2 = left/Tone2.

"leftPedalPart": 0,
> Value of Function 22, "Left Pedal Part", when the Registration is saved. 0 = both, 1 = right/Tone1, 2 = left/Tone2.

"registrationTxCh": 0,
> Value of Function 26, "Reg. Transmit Ch.", when the Registration is saved. 0 = off, 1 to 16.

"registrationBankMSB": 0,
"registrationBankLSB": 0,
"registrationPC": 0
> Value of Function 27, 28, 20 when the Registration is saved.
>
> See the explanation for **singleToneMSB** above to see how to determine these values.
>
> These values are transmitted on **registrationTxCh** when the Registration is selected. But, key-press information is *not* sent on **registrationTxCh**, but on **midiTxCh**, so I don't know how useful it would be. I suppose if you had a foot clavier for bass, this could change the patch of that device as part of a Registration.

"registrationPedalShift" : 0,
> This item is at the top of the file, not part of any Registration. It is presumably the same as Function 23, "Reg. Pedal Shift", where 0 = off, 1 = left pedal, 2 = center pedal. But I haven't tried it.

Side Effects of Using Registrations

The previous section describes 46 parameters that are set when you select a Registration.

In contrast, when you select one of the built-in Tones, only *some* of these parameters are set – the remaining parameters retain their previous values. That can result in the selected Tone not sounding like you expect it to.

For example, the default Registration 1-2, "SuperLightSt", uses the Concert Piano Tone, but sets the **keyTouch** to 5 – *much* lighter than the default value of 50. So only a very light touch is needed. "SuperLightSt" also backs off **upperVolume** from 100 to 60, so the sound doesn't get too loud.

If you select the Registration "SuperLightSt", and then press "Exit", or press "Registration" again, the LCD shows "Concert Piano". But the touch is still set to 5, and the instrument doesn't respond at all like "Concert Piano" usually does.

A useful hack is to reserve one Registration, probably 1-1, to be Concert Piano, resetting **keyTouch**, **upperVolume**, **lowerVolume** and other parameters to their "normal" states. If you have tweaked your piano to your preferred "normal", you may need to change the values in this Registration to match your changes.

If I were the Boss (nyuk nyuk) of Roland and could change the software, I would make a couple changes:

1. Switching out of Registration mode would restore whatever Tone and settings were in effect before you entered Registration mode.
2. Most of the items in the .UPG file would be optional: if a parameter was specified, then selecting the Registration would change it in the sound. If a parameter was not specified, then that parameter would not be changed in the sound. I would find this particularly useful for Transpose: if I set Transpose to suit a particular vocalist, it would be nice to be able to switch between Registrations without making a custom set for each transpose amount.
3. "Split" mode has an editable split point. It would be nice if "Dual" mode had one as well, to specify the highest note of Tone 1. Tone 2 would still cover the full range. I would use this mostly to beef up bass parts: on pipe organ sounds, you might set Tone 1 to be the same sound as Tone 2, but down an octave, and have this effect cover only the bottom few octaves where a pipe organ might use a 32-foot coupler on the pedals. Some of the tone-wheel organs sound a little thin in the lower octaves. You could double these octaves with on one of the bass Tones. You can *replace* the organ sound with a split, but it would be nice to keep the organ sound in there too.
4. The default MIDI receive channel would either be separately editable, follow "MIDI Transmit Channel", or be fixed at 1 for compatibility with MIDI controllers that can't be edited to send on any other channel.

Some MIDI Tips

- The piano is multi-timbral: you can send it MIDI commands on any of the 16 channels, and it will respond. Each channel can have different Tones, parameters etc.
- The receive channel associated with the piano keyboard is *four*, rather than the channel *one* that you might expect. So to use a computer or other MIDI device to change programs or adjust parameters that affect the sound produced when you play the keyboard, you need to send to the piano on channel 4. This is independent of the "MIDI Transmit Channel" that you edit using Function 31: that affects only the channel on which the keyboard *sends* note and parameter data.
- The value of **midiTxCh** affects only messages *sent by* the piano: all notes in Single mode, Right Tone in Split mode, and Tone 1 in dual mode.
- The piano sends on channels 3 for Split Left, and on channel 6 for Dual Tone 2. There doesn't seem to be any way to change these.
- Registration change sends MIDI messages on three channels even if the piano is not in split or dual mode:
  - **midiTxCh** is the main/right Tone
  - channel 3 is split Left Tone
  - channel 6 is dual Tone 2
- If you send CC, PC, or other messages to the piano on channel 4, they affect the sound produced when you play the piano's keys. But if you send these messages on channel 3 or 6, they *do not* affect the sounds produced by the piano keys in Split or Dual mode. And note messages received on channel 4 do not cause the split Left or dual Tone 2 to sound: only the tone selected for channel 4. You can send note messages on channels 3 and 6, and they *are* affected by CC etc. sent on these channels. But received MIDI seems to have no effect on split Left or dual Tone 2.
- If you send MIDI note messages on channels other than 4, the volume is controlled by the "Song Volume" fader. My "sound guy" reflex is to turn down faders for sources that I am not using, so this undocumented use of "Song Volume" had me confused for a while.
- Channel 10 (traditionally used for rhythm) is limited to GM2 sounds – you can't select the main piano Tones etc. The other channels can select any sound bank and program.
- Adjusting Ambience sends CC 91 (Effect 1 Depth) on channels **midiTxCh**, 3, and 6. But sending CC 91 messages to the keyboard does *not* change the Ambience of channel 4. CC 91 *does* affect reverb on

other channels, at least for some Tones, but the reverb effect is not the same as the Ambience effect applied to the same Tones on channel 4.

- On most of the electric organ Tones, pressing the "Organ" button again toggles the rotary speaker effect on and off. It also sends MIDI CC12 (Effect Controller 1) to either 0 (off) or 127 (on). You can't do this with the button when you are using a Registration, but you can set **rotarySpeed** on or off in the Registration, and the rotary toggle can be assigned to left or center pedal using the **centerPedalFunc** or **leftPedalFunc** settings.

- You can send CC12 to the piano to change the effects listed above for the Registration item **modulationSpeed,** or in some cases **rotarySpeed.** However, when the piano receives CC12 on any channel, it affects CC12 on *all* channels. This seems like a bug, or at least undesirable.

Note: it may be that some of the above limitations and peculiarities can be avoided by using undocumented SysEx or NRPM control messages. My experiments have been largely limited to items specified in the document "FP-90 / FP-60 MIDI Implementation", available on the Roland website.

Pedal Usage

The piano comes with a Roland DP-10. This is an analog pedal that generates a continuous range of values rather than simply on and off like a foot switch. The FP-60 and FP-90 support "half damper" operation, so you can use this pedal to get fine control of the damper (aka hold) effect. I confess that after playing piano for 50 years I never knew there was such a thing as "half damper". This may be because few of the acoustic pianos I have encountered in my half century have been in good enough shape for the technique to be feasible (if the piano is out of adjustment, *some* dampers lift and *some* don't, which John Cage might have enjoyed, but I don't).

If you don't intend to use half damper techniques, you might consider using a simple foot switch as your damper pedal, and connect the DP-10 that comes with the piano as the left or middle pedal. That would let you use the analog pedal for functions like pitch bend, expression, or modulation. See **centerPedalFunc** and **leftPedalFunc** above. I use an old Roland switch pedal that is "normally closed": the switch is closed when the pedal is not depressed. The "Troubleshooting" section of the manual implies that the piano should also accept a normally open pedal. As with most keyboards, any pedal, continuous or switched, must be connected to the piano before you turn the power on so that the piano can detect the unpressed state of the pedal.

If you decide to use a foot switch as a damper pedal, you may want to turn "damper noise" off in Piano Designer. Otherwise, the abrupt off/on pedal transition can cause a funky ghost-on-the-strings effect.

Or buy an RPU-3 and have three luscious analog pedals.

Some Ideas for Registrations

1. As mentioned above, reserve one Registration, probably 1-1, to be Concert Piano, resetting **keyTouch**, **upperVolume**, **lowerVolume** and other parameters to their "normal" states. If you have tweaked your piano to your preferred "normal", you may need to change the values in this Registration to match your changes.

2. The Electric Piano Tone 1, "1976SuitCase" is a nice Rhodes sound, but the stereo ping-pong tremolo makes me nauseous, especially through headphones. You can set **modulationDepth** to 0 to disable the tremolo entirely, or set it to something like 80 to give a shimmering sound.

3. Some of the electronic Organ Tones, such as "Combo Jz.Org" sound an octave lower than other Tones.

You can certainly move your hands up the keyboard, but you could also make a Split using the Tone, and use **splitUpperOctaveShift** to transpose the Tone up an octave. If you sent the **splitPoint** to 0, you can ignore the left part and have the entire keyboard be organ.

4. On the other hand, I sometimes find that I want the left Tone of a split to play pitches above the **splitPoint**, or the right Tone to play pitches below the **splitPoint**. You can accomplish this by using the octave shifts to move the left Tone down an octave, or the right tone up an octave, and adjust the **splitPoint** to give yourself some more elbow room. And maybe that's why "Combo Jz.Org" is pre-shifted.

5. "Harpiness" (Strings, 8) is a nice sound, but the half-second echo effect gets old after about two trips across the canyon, and it isn't affected by **modulationSpeed** or any other control that I have found. The base sound is pretty much identical to the GM2 Harp (Other, 124), and using a Registration makes it a lot easier to access than 124 presses of "+". There are a number of other Tones with obnoxious echo, but they don't seem to have exact non-echo equivalents.

Miscellaneous

When editing Registration names on the piano, the character sequence as you press + is
- A through Z
- a through z
- 0 through 9
- ! ? & $ \ # @ + - * / % = . , ' " : ; ( ) [ ] { } < > ^ _ ` ~
- space
- (repeat the sequence)

The microphone jack is TRS. Since the piano's microphone jack has a ring contact, it should also work with a TS cable, with the "ring" side of the piano's differential input connecting to the microphone's ground sleeve.

The TRS pedal jacks have about 3.2 volts on the ring contact relative to the grounded sleeve. The analog pedal presents about 10 Kohms between ring and sleeve, and has the pot wiper connected to tip. When ring and sleeve are shorted, as by the TS plug on a simple foot-switch (or a DP-10 in "switch" mode), the piano limits current to about 0.7 mA.