5704PiaRef User's Manual

Digital Piano Reference V0.50

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1. Making connections

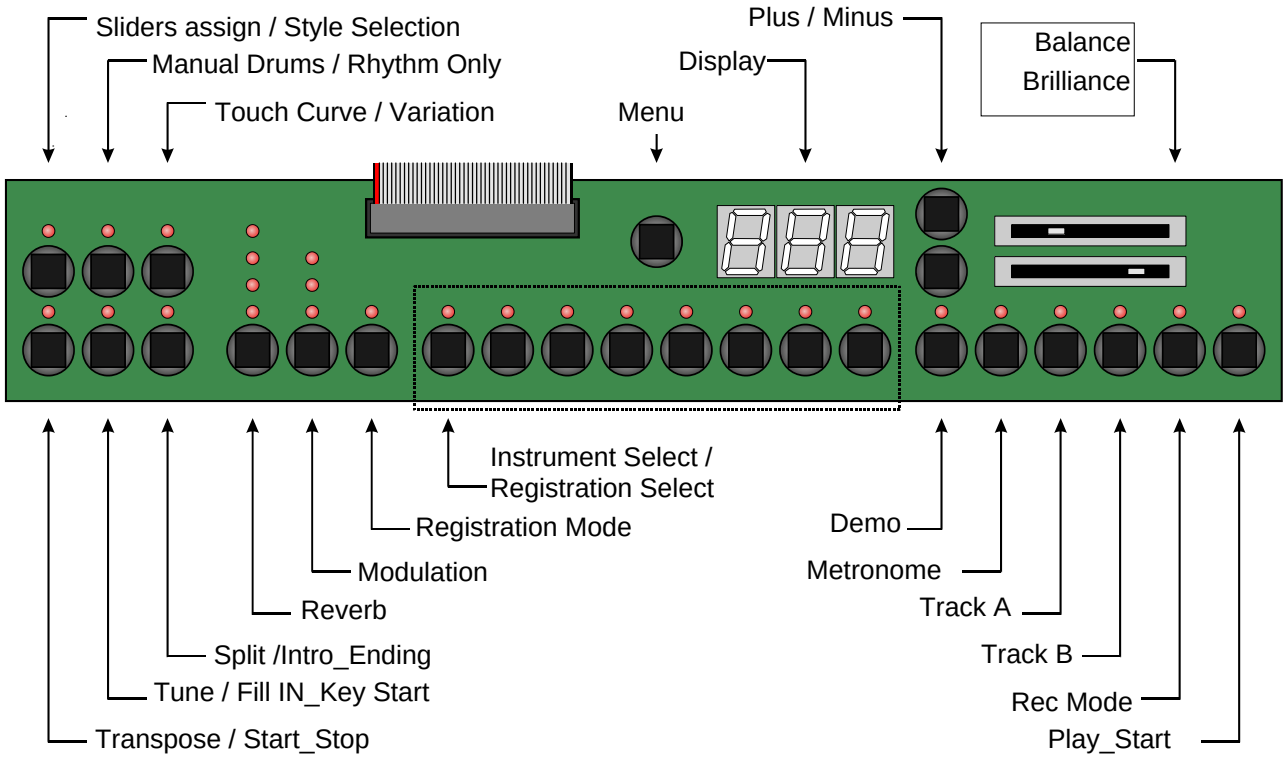
- Connect the Front panel to the main board
- Connect the main board to a FATAR TP40 keyboard
- Connect The main board to pedal (see table below for pinout)
- Connect the main board audio outputs to line level inputs of a mixer, a stereo sound system…
- Connect the main board to 12V/1A DC power supply (- to tip , +to ring)

1.1 Pedal Inputs (J18) Pinout

Pin #	Function	Description
1	Pedal Ground	Reference Ground for pedal inputs
2	Forte (Sustain)	4-level Half-pedal
3	Sostenuto	On/Off pedal
4	Una Corda (Soft)	On/Off pedal

All Pedals are fully ON when connected to Pedal Ground and OFF when open.

2. Front Panel Functions



2.1 Double Function Buttons

Six buttons have double functions in 5704PIA-REF. To alternate between the two sets of functions just press “Plus” and “Minus” buttons at the same time.
Blinking point in right down corner of the LED display shows that double functions buttons are In Style player mode.

Button	Default Function	Alternate Function
Transpose / Start_Stop	Transpose	Start_Stop
Split / Intro_Ending	Split	Intro_Ending
Sliders Assign / Style Selection	Sliders Assign	Style Selection
Tune / Fill In_Key Start	Tuning	Fill In_Key Start
Manual Drums / Rhythm Only	Manual Drums	Rhythm Only
Touch Curve / Variation	Touch Curve	Variation

2.2 Functions

This chapter describes the various mapped features.

2.2.1 Instrument Select

1: Studio Grand Piano	2: Concert Grand Piano
3: Electric Piano 1	4: Electric Piano 2
5: Harpsichord	6: Vibes
7: Strings	8: Choir

Layer (Dual) mode is available by simultaneously pressing two “Instrument Select” buttons.

2.2.2 Split

- Press the “Split” button to activate Split function. “Split” LED will turn on.
- If Dual mode is activated:
  - First selected sound in previous Dual mode is played on right of the split point (Upper sound).
  - Second selected sound in previous Dual mode is played on left of the split point (Lower sound). It is transposed one octave up.
- If not in Dual mode:
  - Current selected sound is played on right of the split point (Upper sound)
  - Strings sound is played on left of the split point (Lower sound). It is transposed one octave up.
- Default split point is G2 (MIDI note #55). Split point can be changed:
  - Press and hold the “Split” button, then press a key on the keyboard.
    The pressed key becomes the lower note for the Upper sound.

2.2.3 Transposet

Global transpose is available in the range (-12,+12 semitones)

- Press and hold the “Transpose” button, then press the “Plus” or “Minus” button to specify the desired transposition value.
  - The “Transpose” LED will turn on, indicating that the transpose function has been activated.
  - The current transpose setting will be shown in the display.
- To cancel transpose, select value “0” or press again the “Transpose” button. “Transpose” LED will turn off.
- Transposition value is memorised until power off.
  - To recall memorized transposition, press the “Transpose” button. “Transpose” LED will turn on.

2.2.4 Tuning

Global tuning is available in the range (427.0, 453.0Hz)

- Press “Tuning” button. The “Tuning” LED will turn on. Default value is 440.0Hz. Display shows “**40.0**”
- Use the “Plus” or “Minus” button to specify the desired tuning value. Display is “**27.0**” ~ “**53.0**”. Steps are 0.5Hz.
- Press “Tuning” button to quit.

2.2.5 Reverb

- Press the “Reverb” button to step through the reverb presets
  - OFF / Room1 / Room2 / Hall / Plate
- Press and hold “Reverb” button, then press “Plus” or “Minus” to adjust reverb depth in the range 1-20

2.2.6 Chorus

- Press the “Chorus” button to step through the chorus presets
  - OFF / Chorus1 / Chorus2 / Short Delay
- Press and hold “Chorus” button, then press “Plus” or “Minus” to adjust chorus depth in the range 1-20

2.2.7 Touch Curve

For each instrument, the following touch curves can be selected: Soft / Medium / Hard / Constant Velocity (default = 64)

- Press the “Touch Curve” button. The “Touch Curve” LED will turn on. Default value for current selected instrument will be displayed: “**S F t**” message for Soft curve, “**M E d**” for Medium curve, “**H r d**” for Hard curve and “**C S t**” for Constant curve
- Press the “Touch Curve” button again for exit.

The value for the constant velocity can be set:

- While constant curve is selected, hold the “Touch Curve“ button pressed until the display shows the current constant dynamic value.
- Use the “Plus“ and “Minus” buttons for adjusting the constant dynamic in the range 0-127

2.2.8 Demo

- Press the “Demo” button to activate Demo-Menu.
  - if Registration-Menu or Drum-Menu is open it will be closed
- Use the “Instrument-Select” buttons to select a Demo-Song

2.2.9 Metronome

- Press the “Metronome” button to start/stop the metronome
- Press and hold the “Metronome” button, then use “Plus” or “Minus” to select signature.

2.2.10 Manual Drums

- Press the “Manual Drums” button to activate
- Drums can now be played on the keyboard
- Drums will be recorded to track 10 in the recorder, ignoring Track-A/B-Setting (see **2.3**)
- Use the “Instrument-Select” buttons to select a Drumkit
  - 1: Standard Set
  - 2: Room Set
  - 3: Power Set
  - 4: Electric Set
  - 5: TR808
  - 6: Jazz
  - 7: Brush
  - 8: Orchestra

2.2.11 Sliders assign

	Led Off	**Led On**
Upper Slider	Balance	GM-Player Volume
Lower Slider	Brilliance	Metronome Volume

2.2.12 BPM

Use the “Plus” and “Minus” buttons to select BPM

2.2.13 Menu

This Buttons opens or closes the menu.

See Chapter **3.**

2.2.14 Registrations

Presets can be stored in 8 Registrations. Registrations are memorized even after power off.

Registrations retain the following parameters:

- Press the “Manual Drums” button to activate
- Reverb Type
- Reverb Volume
- Chorus Type
- Chorus Volume
- Touch Curve
- Tempo
- Upper Sound
- Lower Sound
- Upper Volume
- Lower Volume
- Split On/Off
- Split point
- Transpose
- Tune
- Temperament
- Root Note
- Lower Octave Shift
- Damper Pedal Assign

To save your current setting in one registration, do the next steps:

- Check that the “Registration” LED is off.
  - If it is On, press the “Registration” button to quit the registration mode.
- Adjust all parameters until you get the setting that you want to save in one registration
- Press and hold “Registration” button.
  - The last used Registration will blink.
  - Press one of the 8 “Instrument select” buttons.
  - The current setting is now stored in the registration corresponding to the “Instrument Select” button that you have pressed.

To recall a registration:

- Enter registration mode by pressing “registration” button.
  - “Registration” LED is On to show that you are in registration mode.
- To recall a registration, just press the corresponding “Instrument” select button.

To exit registration mode:

- Press the “Registration” button to get the “Registration” LED Off

2.3 Song – Recorder

A 2-Track, 3-song sequencer is implemented in the PiaRef.

Also see Recorder Menu and Recorder Example

2.3.1 Rec Mode

- Should be pressed before starting a track record. Then, track to be recorded can be selected.
- Allow to stop the track record.

2.3.2 Play Start

- Start playing the selected recorded song
- Stop playing the selected recorded song

2.3.3 Track A

Selects the first Track for recording.
Mutes previously recorded Track A when recording or during playback.

2.3.4 Track B

Selects the second Track for recording.
Mutes previously recorded Track B when recording or during playback.

3. Root Menu

The Root menu can be reached by pressing the “Menu” button.
The current menu page can be selected with “Plus” and “Minus”
Pressing the “Menu” button again will exit the menu.

3.1 SD Menu

General information: PIA-DK firmware support SDCard with FAT16 (up to 4 GByte) or FAT32 file systems.

Only Standard MIDIFile in format 0 (or format 1 with 1 track) are supported.

SD functions can be accessed by pressing on the 'Menu' button and scroll through the menus with 'Plus' and 'Minus' until the display shows “**S d.C**”.

Then following functions can be used:

3.1.1 Select one File

Scroll across SDCard MIDIFiles and select one file.

- Press the first ”Instrument select” button. Display toggles between “**F i l** ” and “**S.x x** ” or “**r.x x**”, or “**F.x x** ” if one SD that contains Standard MIDIFiles (SMF) is inserted in SDMMC socket. If no SD inserted or SD without SMF, display will toggle between “**F i l** ” and “**- - -** “.
- Use “Plus” and “Minus” buttons to select the SMF that you want to play, to load or to delete.

  - SMF created with the piano recorder (Piano Song) and with name in format **:** “SONGxx.MID” be displayed in format “**S.*x x*** ”***. xx*** is the value of the 2 digits in name.
    Example***:*** “SONG56.MID” will be displayed as “**S.5 6** ”***.***

  - SMF created with the piano recorder (Piano Song) and with name not in format ***:*** “SONGxx.MID” be displayed in format “**r.*x x*** ”***.* xx** is the value of the index of the song in the SD directory.
    Example***:*** Piano song “MyRecord.MID” will be displayed as “**r.0 1** ” if it is referenced at the index 1 of the SD directory***.***

  - If name of SMF was not created with the piano recorder, display will be “**F.*x x*** ”***. xx*** is the value of the index of the song in the SD directory.
    Example***:*** “PRELUDE.MID” can be displayed as “**F.0 2** ” if it is referenced at the index 2 of the SD directory.

3.1.2 Play File

When in SD Select File mode you can play directly from SD the File that is currently displayed. For that, simply press the “Play Start” button

3.1.3 Save Song to SD

Save the current sequencer Song to SD in SMF format. This menu can be reached only if unlocked SD that contains SMF is inserted

- Press the second ”Instrument select” button. Display toggles between “**S A.F** ” and “**S.x x**”.
  xx is automatically set to the next upper value of the current highest Piano Song index
- Press “Plus” button. Display shows “**S u r** ”.
- Press again “Plus” button to confirm your choice or “Minus” to abort. If confirmed, Song will be saved on SD with name SONGxx.MID. Display shows “ **E n d** ”. If aborted Song is not saved and display shows “ **A b o** “

3.1.4 Load Song from SD

Load File from SD to internal memory.

- Press the fourth ”Instrument select” button. Display toggles between “**L d.F** ” and the currently selected file name.
- Press “Plus” button. Display shows “**S u r** ”.
- Press again “Plus” button to confirm your choice or “Minus” to abort. If confirmed, the latest Piano Song that was selected with SD Select function is loaded to currently selected song of sequencer. If aborted Song is not loaded and display shows “ **A b o** “
  If file is not a Piano Song, load operation will b and display will show “**E r r** ”.

3.1.5 Delete SD File

Delete File of SD. This menu can be reached only if unlocked SD that contain SMF is inserted

- Press the fourth “Instrument select” button. Display toggles between “**d l.F** ” and “**Y E S** ”
- Pressing the “Plus” button now, will delete the latest SMF that was selected with SD Scroll function
- Pressing the “Minus” button will cancel the Delete operation and escape from SD Functions.

3.2 Recorder Menu

Recorder-Menu can be accessed by pressing on the 'Menu' button and scroll through the menus with 'Plus' and 'Minus' until the display shows “**r E C** ”.

3.2.1 Song Select

- Press the first “Instrument Select” button.
  - Display shows “**S n.1** ”. Song #1 is selected
  - Use “Plus” and “Minus” to select another Song

3.2.2 Track Pair Select

- Press the second “Instrument Select” button.
  - Display toggles between “**t r.P** " and “**0 - 1** ”.
  - Use “Plus” and “Minus” buttons to select track pair 0-1 or 2-3.

3.3 Function Menu

Advanced functions can be accessed by pressing on the 'Menu' button and scroll through the menus with 'Plus' and 'Minus' until the display shows “**F n c**”.

3.3.1 Lower Octave Shift

Octave shift for the lower sound.

- Press the first ”Instrument select” button. Display toggles between “L.O.S " and “ 1 ”. Use “Plus” and “Minus” buttons to select the octave shift in range“0-2”.

3.3.2 Temperament

- Press and hold the third “Instrument Select” button.
  - Display shows “**t M P** ”
  - Use “Plus” and “Minus” to select Temperament
- Following Temperaments are available:
  - “**E q U** ” : Equal
  - “**P y t** ” : Pythagorean
  - “**M A J** ” : Pure Major
  - “**M I n** ” : Pure Minor
  - “**M E n**”: Mean Tone
  - “**M S 3**” Werckmeister III
  - “**b G 3** ”: Kirnberger III

3.3.3 Root Note

Root note should be specified for temperaments others than the Equal one.

- Press the fourth ”Instrument select” button. Display toggles between “**r t.n** " and “ **C** ”. It means that root not for is currently selected temperament is C.
- Use “Plus” and “Minus” buttons to select another root note. “ **C ‘** “ in display means C#.

3.3.4 Audio Input

5704PIA-FK has a stereo audio input that can be used with different settings.

- Press the fifth ”Instrument select” button. Display toggles between “**A.i n** " and “ **O F F** ”. Audio in is disabled.
- Use “Plus” and “Minus” buttons to switch between settings:
  - “ **L.I n** ”. Line in config. Audio In Left mixed in Output Left without Reverb and Audio In Right mixed in Output Right without Reverb
  - “ **M c.1** ”. Mike input config 1. Audio In Left mixed in Output Left and Output Right with low send to Reverb. Audio In Right is Off.
  - “ **M c.2** ”. Mike input config 2. Audio In Left mixed in Output Left and Output Right with medium send to Reverb. Audio In Right is Off.
  - “ **M c.3** ”. Mike input config 3. Audio In Left mixed in Output Left and Output Right with high send to Reverb. Audio In Right is Off.

3.4 MIDI Menu

Midi parameters can be configured by pressing repetitively on the “Set” button until the display shows “**M i d** ”. Then following parameters can be adjusted:

3.4.1 Transmit channel

Transmit channel is MIDI transmit channel for keyboard upper notes. Keyboard lower/dual notes will be transmitted on next greater channel.

- Press the first ”Instrument select” button. Display toggles between “**t r.C** ” and “ 1 ”. Use “Plus” and “Minus” buttons to select the Midi transmit channel in range“1-16”

3.4.2 Local Control On/Off

Local Control On/Off function allows connecting or not the Sound engine to Keyboard. If Local Control is On keyboard can play sound engine and send notes info to MIDI out. If Local Control is Off keyboard is not connected to sound engine but it continues to send notes info to MIDI out.

- Press the second “Instrument select” button. Display toggles between “**L c l** " and “**O n** ”. Use “Plus” and “Minus” buttons to set the Local control to “**O n** ” or “**O f f** ”

3.4.3 Program Change On/Off

Program Change On/Off function decides if Program Change are received and transmitted by piano board-.

- Press the third “Instrument select” button. Display toggles between “**P G.C** ” and “**O n** ”. Use “Plus” and “Minus” buttons to set value to “**O n** ” or “**O f f** ”

3.4.4 Piano Mode On/Off

Piano Mode On/Off decides how the MIDI In will be played:

If Piano Mode is on, only Note and Pedal event are kept. All MIDI in channels are played in the same way that if you were pressing the keys on the keyboard. All buttons of the piano front panel and their functions can be used in this mode.
If Piano Mode is Off, MIDI In channels 1-16 are played in GM mode.

By default, Piano mode is On. Receiving a system excusive message GM Reset or GS Reset on MIDI In will switch off the Piano mode. Piano mode setting can also be done manually:

- Press the fourth “Instrument select” button. Display toggles between “**P.M d** " and “**O n** ”. Use “Plus” and “Minus” buttons to set the Piano mode “**O n** ” or “**O f f** ”

4. Examples

4.1 Recorder Example

4.1.1 Select song 2

- Press “Menu” to open the Menu [**3.**]
- Navigate to “REC” Menu with “Plus” and “Minus” [**3.2**]
- Press first Instrument-Select button and use “Plus” and “Minus” until Displays shows “**S n.2** ”
- Press “Menu” twice to exit Menu

4.1.2 Record drum track (optional)

- Press “Manual Drums”
- Press “Rec Mode” to switch Sequencer into Record-Mode. “Rec Mode” Led is blinking
- Record automatically starts when pressing the first drum key
- Press “Rec Mode” again to stop recording.

4.1.3 Record track 1

- Disable “Manual Drums”
- Press “Rec-Mode” to switch Sequencer into Record-Mode
- Track 1 is is selected by default. “Track A” and “Rec Mode” Leds are blinking
- Record can be started by pressing “Play Start” or by playing first note. You will hear the previously recorded drums.
- Press “Rec Mode” again to stop recording.

4.1.4 Play track 1 + Drums

- Press “Play Start”. You will hear the previously recorded drums and track 1.
- Press “Play Start” to stop, or wait for the song to finish.

4.1.5 Record track 2

- Press “Rec Mode” to switch Sequencer into Record Mode
- Press “Track B” to select track 2. “Track B” and “Rec Mode” Leds are blinking
- Record can be started by pressing “Play Start” or by playing first note. You will hear the previously recorded drums and track1.
- Press “Rec-Mode” again to stop recording.

4.1.6 Play track 1 and 2 + Drums

- Press “Play Start”. You will hear the previously recorded drums, track 1 and track 2.
- Press “Play Start” to stop, or wait for the song to finish.

4.1.7 Record track 3

- Press “Menu” to open the Menu [**3.**]
- Navigate to “REC” Menu with “Plus” and “Minus” [**3.2**]
- Press second Instrument-Select button and use “Plus” and “Minus” until Displays Display toggles between “**t r.P** " and “**2 - 3** ”.
- Press “Menu” twice to exit Menu
- Press “Rec Mode” to switch Sequencer into Record Mode
- Press “Track A” to select track 3. “Track A” and “Rec Mode” Leds are blinking
- Record can be started by pressing “Play Start” or by playing first note. You will hear the previously recorded drums and track1.
- Press “Rec-Mode” again to stop recording.

4.1.8 Play track 1, 2 and 3 + Drums

- Press “Play Start”. You will hear the previously recorded drums, track 1, track 2 and track 3.
- Press “Play Start” to stop, or wait for the song to finish.

4.1.9 Delete song 2:

- Press “Menu” to open the Menu [3.]
- Navigate to “REC” Menu with “Plus” and “Minus” [3.2]
- Press first Instrument-Select button and use “Plus” and “Minus” until Displays shows “**S n.2** ”
- While keeping “Rec Mode” button pressed, press “Play/rec Start” button. Selected song is immediately deleted.

If the song to delete is the current one, only the last step is needed.

5. Optional Functions

5.1 Style Player

Use “Intro_Ending”, “Fill-In”, “Start_Stop”, “Variation”, ”Rhythm Only”, “Style selection” buttons.

Style Selection: Press the “Style Selection” button then select with “Plus“ and “Minus” buttons.

0: EuroPop,	1: 90sDance,
2: KickDance,	3: 80sPop,
4: TechnoRock,	5: Country,
6: Beguine,	7: Bossa,
8: Blues,	9: JazzTet,
10: Rock&Roll,	11: Soca,
12: Lounge,	13: Waltzer

Recognized chords:

Maj	Maj6	Maj7	Maj7_s114	Maj9	Maj7_9	Maj6_9		
Aug	Min	Min6	Min7	Min7b5	Min_9	Min7_9		
Min7_11	MinMaj7	MinMaj7_9	Dim	Dim7	7th	7sus4		
7b5	7_9	7_s11	7_13	7_b9	7_b13	7_s9		
Maj7aug	7aug	1p8	1p5	sus4	1p2p5			

6. **Feature Table**

FEATURES	DETAILS
Sounds	8 sounds selectable from panel 128 GM sounds + 99 variations selectable from MIDI Manual Drums
Memory for piano samples	16 MByte
Memory for GM sound + variations.	11 MByte
Sound Engine	32-parts Multitimbral high range Wavetable Synthesizer
Polyphony	Up to 81 voices with effect
Display	3-digit LED
Effect	Reverb (Room1, Room2, Hall, Plate) Chorus (Chorus1, Chorus2, Short Delay)
Metronome	Time signature: 1/4, 2/4, 3/4, 4/4, 5/4, 3/8, 6/8, 12/8 10-400 bpm with volume control
Sequencer	3 songs, 4 dual tracks per song, 15 000 event per song SMF format 0, storage in DataFlash
Demo	3 demo songs
Registrations	8 registrations for user Storage in DataFlash
Touch Curve	Soft, Medium, Hard, Constant (programmable from 0 to 127 by user)
Dual	2-sound layer with volume balance
Split	Programmable Split point
Transpose	-12 to +12 semi-tones
Tune	427 to 453 Hz
Temperaments	Equal, Pythagorean, Pure Major, Pure Minor, Mean Tone, Werckmeister III, Kirnberger III Programmable Root Note
USB	USB MIDI (to Host) Sound Bank and Firmware update
SD Card	SDMMC socket. SD Card support, up to 4 GByte Save sequencer song in SMF format 0, Read SMF, Load SMF format 0, Delete SMF
Style Player	8-part, 2-group style player 1 volume per group 14 Styles with Intro, Ending, Fill in, Variation Start-Stop, Rhythm Only, Easy Chord
Pedals	Damper (4 levels), Sostenuto, Soft
Reset	Recall of factory Registrations and settings
Production Test	Test for front panel: Leds, Display, Switches, Pedals, Sliders Test for soundboard components: SAM5704, DataFlash, Serial Flash, MIDI test Play sine wave for audio test
Mike Input	mike input with reverb

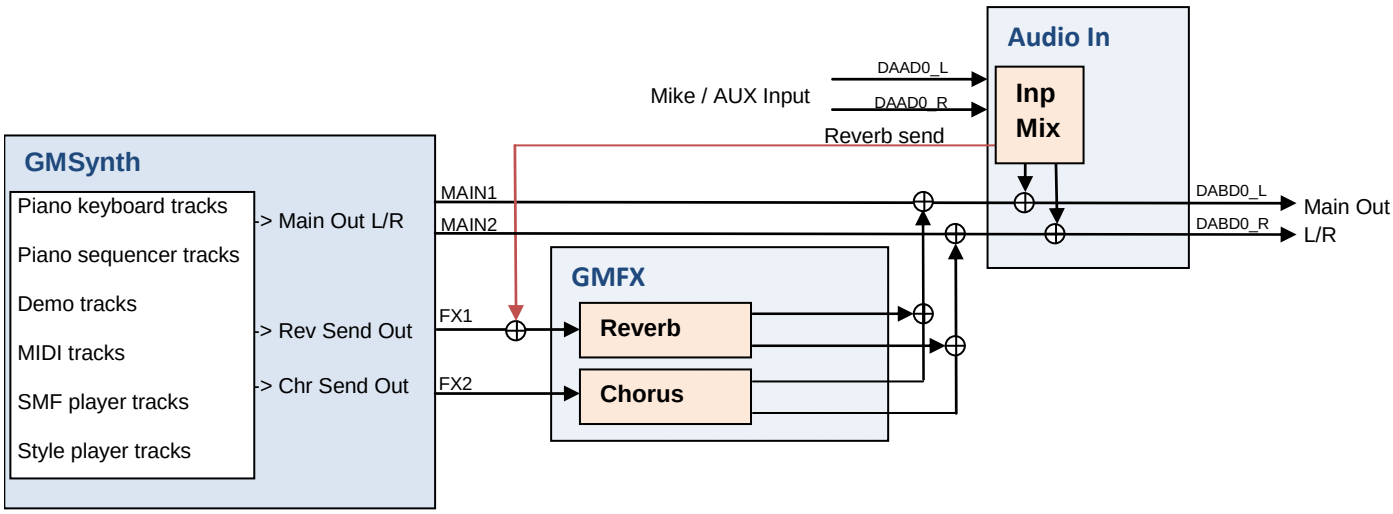
7. Technical Information

7.1 Track Mapping Table

Pia-Ref firmware has a built in 32-tracks GM synthesizer. Mapping of the sound tracks is shown in the table below:

Source	Track # (0-31)
Keyboard Single or Upper Sound	0
Keyboard Dual or Lower Sound	1
Keyboard Manual Drums	9
Metronome	15
GM-Player (Demo, GM-MIDI-IN, SD, Recorder)	16-31
Style Player	24-31

8. Pia-Ref DSP Modules and Audio Routings



9. MIDI Implementation

See document: SamVS-C GM2Synth Library.pdf / § Detailed MIDI Implementation

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