

Surplus Collateral

In addition to paying and receiving surplus collateral in the input/output of swap, mint and burn calls user can directly deposit, withdraw or transfer their surplus collateral balance.

All of these surplus collateral use callpath 0 with specific

Deposits

To deposit surplus collateral, the user should call the following user command:

...

```
Copy userCmd(1, abi.encode( 73, // Fixed sub-command code recv, // address value, // uint128 token // address ))
```

...

- recv - The address the surplus collateral will be credited
- value - The total amount deposited
- token - The address of the ERC20 token deposited or address(0)
- for native Ethereum
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Note that deposit will use `transferFrom()` in to deposit the surplus collateral, so the user must approve or permit at least value amount of the token. In the case of native Ethereum, the deposit is collected from `msg.value` so the user must attach at least the amount matching the value parameter to the Ethereum transaction.

For EIP-2612 compliant tokens, users can deposit using an off-chain permit signature avoiding the need to approve the DEX contract:

...

```
Copy userCmd(0, abi.encode( 83, // Fixed sub-command code recv, // address value, // uint128 token, // address deadline, // uint256 v, // uint8 r, // bytes32 s // bytes32 ))
```

...

- deadline - The deadline for the permit call
- v, r, s - The EIP-712 signature to be passed directly to the token contract
-

Withdraw

To withdraw surplus collateral, the user should call the following user command:

...

```
Copy userCmd(0, abi.encode( 74, // Fixed sub-command code recv, // address value, // uint128 token // address ))
```

...

- recv - The address the surplus collateral will be sent to
- value - The total amount to withdraw from surplus collateral. 0 is treated as a magic value that will withdraw the entire balance.
- token - The address of the ERC20 token or address(0)
- for native Ethereum
-

Transfer

Users can also bilaterally transfer surplus liquidity between owner addresses:

...

```
Copy userCmd(0, abi.encode( 75, // Fixed sub-command code recv, // address value, // uint128 token // address ))
```

...

- recv - The address the surplus collateral will be transferred to
- value - The total amount to transfer from surplus collateral. 0 is treated as a magic value that will withdraw the entire balance.

- token - The address of the ERC20 token or address(0)
- for native Ethereum
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