

The Application Note is pertinent to the Unidrive Family

Local / Fieldbus Remote Control for the Unidrive with the UD77 DeviceNet Co-Processor

Scope

The SYPT program “Field-bus Local Remote”, Author Jim Jeffers, present Version 1.0.5 is described in this Application Note and will be more briefly referred to in this note as “the program”, “this program” or “the code”.

This program was designed to provide conditional, local “terminal” control for one or more Unidrive(s) on a DeviceNet network. One of the primary design goals of this program was to provide a means to use a simple 3-wire, N.O. start PB and N.C. stop PB with a Unidrive fitted with a DeviceNet option, and to “fix” the various problems that this capability creates.

This Application Note also describes implementing several useful local input configurations with the program.

Background

When fitted with a UD77 DeviceNet Co-processor, the standard Unidrive has no provision for any form of local “terminal” control.

The Master device (usually a PLC) on the fieldbus directly writes to virtual parameter #90.11. Without any local processing, all operator input(s) must route to the Master (PLC), control logic be performed within the Master device (PLC), and the result written to the Unidrive via the Control Word virtual parameter #90.11. One consequence of this arrangement is, when no Master device (PLC) is available, no control is available.

Proper fieldbus control also requires that the Unidrive be configured in sequencing mode 4. Momentary start and stop control can not be configured directly in the Unidrive in this sequencing mode.

Program Features

In general, the features provided by this program are completely compatible with, and simply extend the digital I/O capabilities of the Unidrive.

The program implements a means to de-select normal fieldbus control of the Unidrive and to put the Unidrive in a “In Local” control mode, independent of the fieldbus Master device (PLC). A bit parameter (presently #18.50) is always available to permit selection between Local or Field-bus Remote operation. This program implements user-assigned pre-programmed “local” input functions. A total of 13 new local input function definitions are implemented and available for user-assignment to the Unidrive’s local inputs. The program automatically detects the presence of an external I/O module (UD50) and supports the user-assignment of the new local function codes into both the normal menu 8 and menu 16 locations that this implies.

The program supports the input inversion of all but one of the new local function codes and does so via the usual menu 8 (and menu 16) parameters utilized by the Unidrive for this purpose.

Program Features (continued)

The "Local Run Permit" input (Code 10) does not support inversion and must be "active" when present, or the drive will not move in any mode.

The program only extends the available types of inputs for the Unidrive, and scans the usual menu 8 (and menu 16) locations to determine the input or output personality of the digital I/O that can be user-configured as an output.

- This program implements two user-assigned local input function codes that are scanned and solved for at all times, when one or both of these input functions are assigned.
 - **Code "1"** Local "Local/Field-bus Remote" is user-assigned to an input definition via a "0.01" or Code "1". When assigned to an input and this input is solved TRUE, the program will be in the "In Local" control mode.
 - **Code "10"** Local Run Permit is user-assigned to an input definition via a "0.10" or Code "10". When this input function is assigned, the program provides the needed logic to force a stop no matter which control mode the program is in.

Note that a user may choose not to assign these input functions. This program only provides support for a single instance of these two function codes to any local input (i.e. assignment of a single "code 1" to an input and/or a single "code 10" to a different input). If multiple assignments are present, the code will find the first one and ignore the others. The search order is menu 8, from smallest to largest. If a UD50 is present, menu 16 is then searched for assignments from smallest to largest.

- This program implements eleven local input function codes that are scanned and solved only when the program is in the "In Local" control mode.
 - **Code "2"** Local "Run", maintained, Reverse definition modifies
 - **Code "3"** Local "Run Forward", maintained
 - **Code "4"** Local "Reverse", maintained
 - **Code "5"** Local "Jog Mode", maintained, Run Forward, Run Reverse definition modifies
 - **Code "6"** Local "Run Reverse", maintained
 - **Code "7"** Local "Jog Forward", maintained
 - **Code "8"** Local "Jog Reverse", maintained
 - **Code "9"** Local "Jog", maintained, Reverse definition modifies
 - **Code "11"** Local "Start MO", momentary, Reverse definition modifies
 - **Code "12"** Local "Run Forward MO", momentary
 - **Code "13"** Local "Run Reverse MO", momentary
- This program provides a single "Rule" to conditionally control the scanning and solving of local input(s) after the program has been "forced" into the "In Local" control mode.

To implement a local stop while in the "In Field-bus Remote" control mode, the program will "force" an "In Local" control mode.

"Rule 1" is presently controlled by parameter **#18.49**. **"Rule 1"** is described as follows: "If Local is forced, permit scan, solve all local inputs"

Rule 1 = TRUE - all local inputs scanned and solved.

Rule 1 = FALSE - restricts local input scan and solve to just "Local/Field-bus Remote", "RunPermit", and evaluate the input control word from the Master device (PLC) via the Scanner.

- Once “forced” into the “In Local” control, the program removes the force and reverts to the control mode dictated by it’s input(s) under the following conditions:
 1. The local input or internal logic changes from calling for the “In Field-bus Remote” control mode to the “In Local” control mode.
 2. The input control word from the Master device (PLC) via the DeviceNet Scanner changes to a “bit pattern” that no longer can cause motion.
 3. Note that if this same input control word is all zero(s), the program will solve this as a “Stop” when in the “In Field-bus Remote” control mode.

- This program requires that both a local “Run Permit” input assignment and a momentary style input assignment (such as local “Start MO”) must be present for a complete “In 3-Wire” configuration to be defined. If a momentary function is assigned to an input without a “Run Permit” assignment also present to a different input, the program remains in an internal 2-Wire configuration, and the momentary inputs are not “latched”.

- This program provides two menu 19 bit parameters as status bits to improve the “observe-ability” of the internal state of the program.
 1. Parameter **#19.50** reflects the status of the “In Local” control mode.
 2. Parameter **#19.49** reflects the status of the “Forced Into Local” control mode.

- This program expects and enforces the following Unidrive parameter values:
 1. Parameter **#6.04** = 4
 2. Parameter **#20.06** = 2021

Program usage

1. Load program into UD77 via “SYPT” development environment or load the “*.bin” file via “Flasher.exe”.
2. Set parameter **#17.13** = “1”.
3. Make the local connections to the Unidrive terminal strip. Configure menu 8 digital I/O as required. Be sure to set any destinations that point to **#6.30**, **#6.31**, and **#6.32** to a zero value or to one of the new “local input codes”. See the examples in the next section for ideas.
4. Wire in a 2k to 10k potentiometer into analog input 1 for the local speed reference.
5. Configure menu 20 as follows

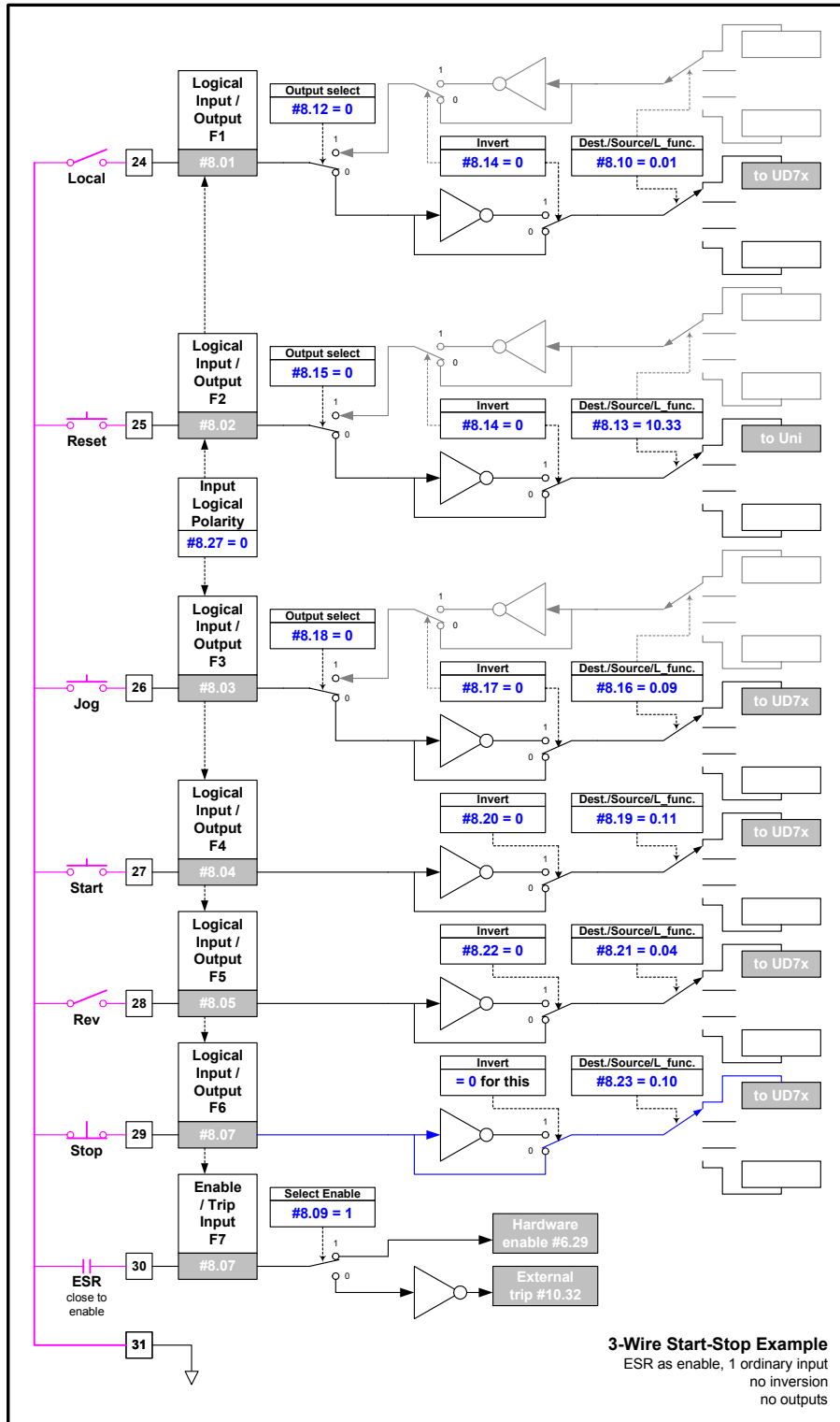
Parameter	Value	Comment
#20.01	121	destination. Out Word 2, speed reference
#20.02	408	destination. Out Word 3, torque reference
#20.03	201	source In Word 2, speed actual
#20.04	402	source In Word 3, torque actual
#20.05	1 to 62	MAC-ID note that 63 used for new device on network
#20.06	2013	destination. Out Word 1, re-directed to #20.21 (enforced by program)
#20.07	9011	source In Word 1
#20.08	0, 1, or 2	Data rate 0=125 Kbs, 1=250 Kbs, 2=500 Kbs
#20.09	NA	Node status, RO
#20.10	NA	Net statue, RO
#20.11	0 or 1	Trip enable 0=Disabled, 1=enabled
#20.12	0	Product Elaboration Code (SOM, Advanced EDS Compiler dependent)
#20.21	NA	place holder for the Control Word from the PLC via the Scanner

6. Save your work via “x.00 = 1000 and reset”; #17.19 = “1”; and “x.00 = 1070 and reset”.
7. Program is now running. At this point local inputs can be tested and corrected by setting #18.50 = “1”, which places the program into “In Local” control.
8. Configure the DeviceNet Master (usually a PLC) and DeviceNet Scanner and get the Field-bus Remote logic working to finish project. See UD77DN_Start_Up_Guide.pdf for additional help with this portion of your project. This manual is available at the following URL:

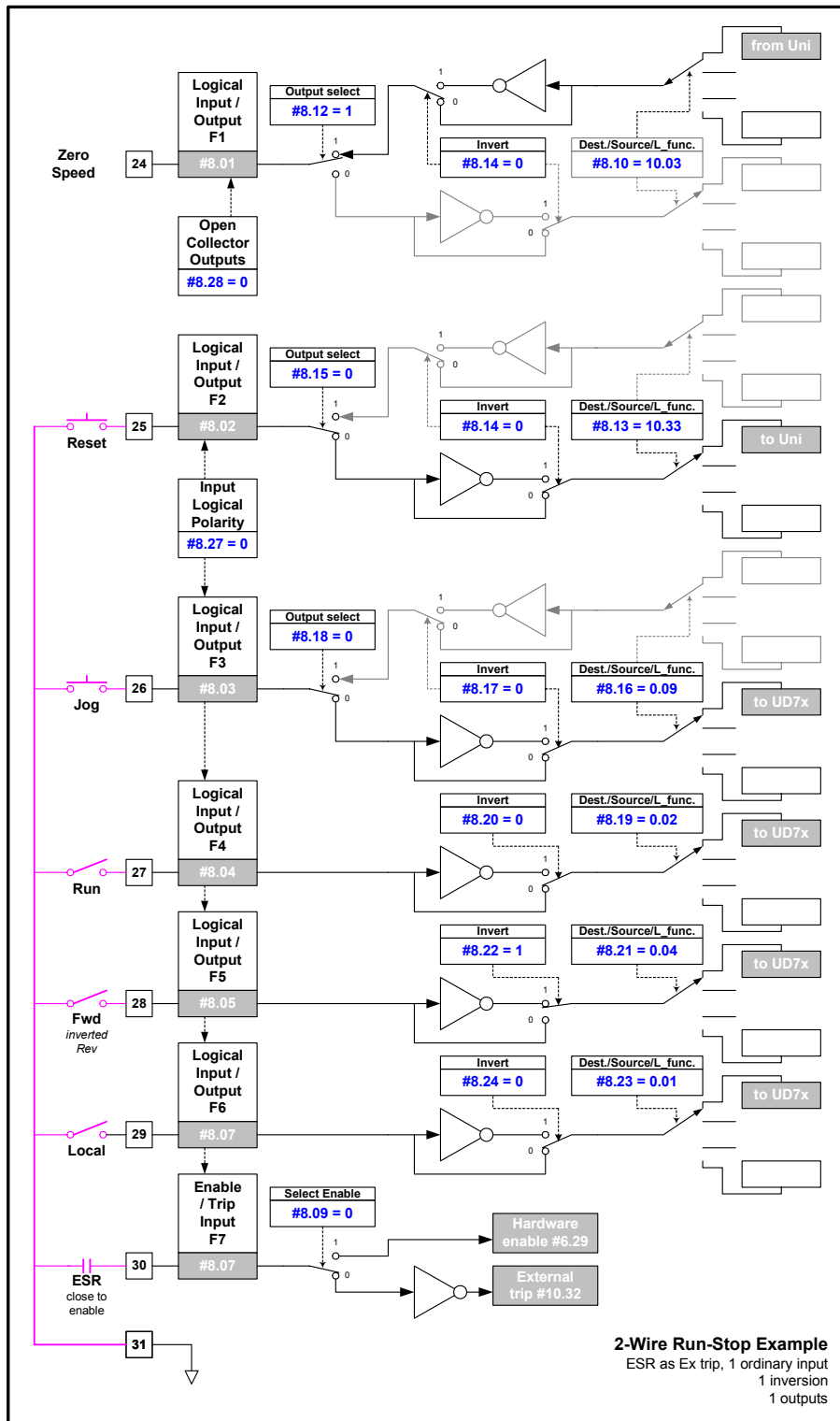
http://www.ctdrives.com/downloads/files/Manuals/UD Modules/UD77DN_Start_Up_Guide.pdf

Author: **Jim Jeffers** **e-mail :** <mailto:jim.jeffers@emersonct.com>
 (716)-774-1193

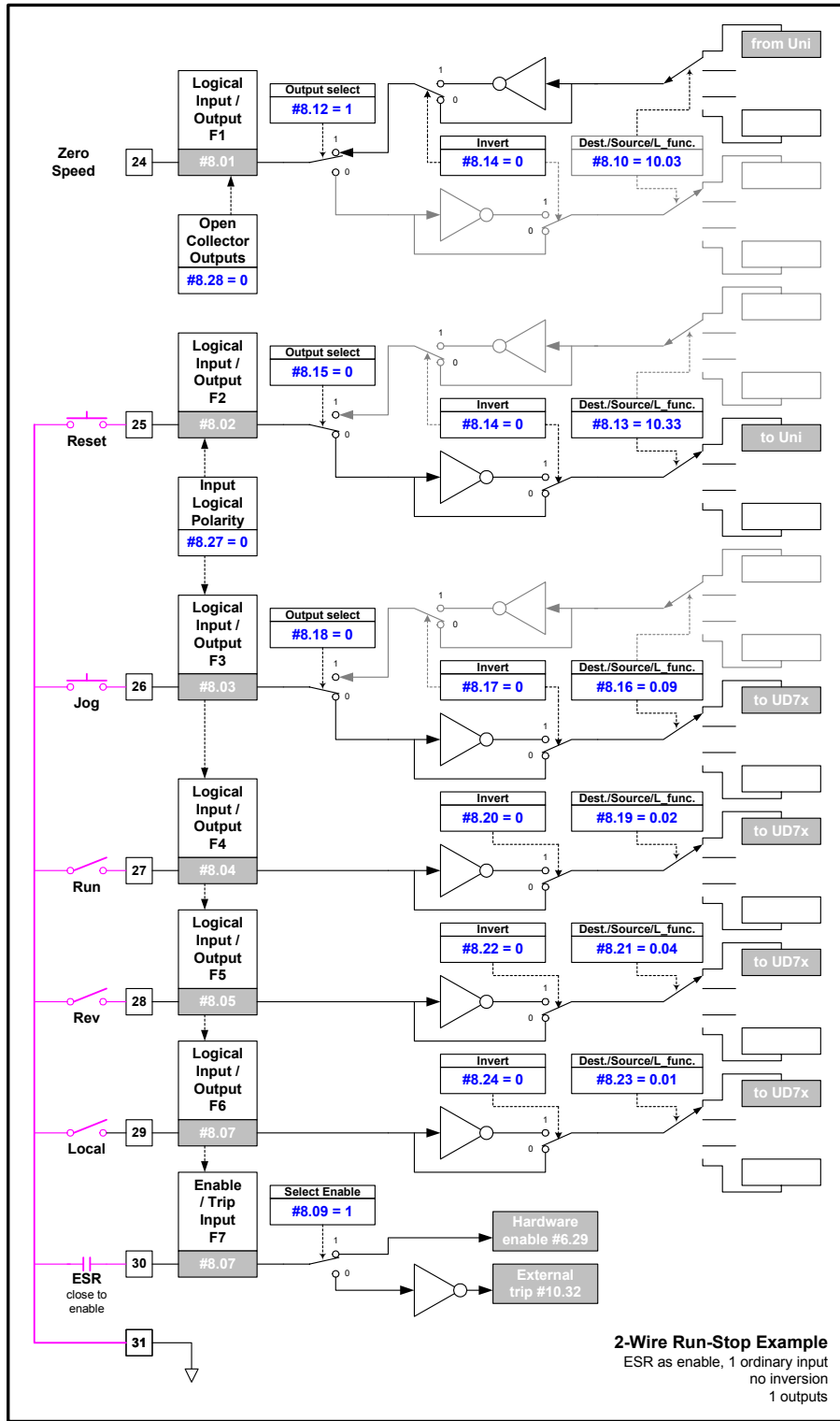
Common Input configuration examples



Example 1 connection and parameter configuration detail



Example 2 connection and parameter configuration detail



Example 3 connection and parameter configuration detail

Author:

Jim Jeffers
 (716)-774-1193

e-mail : <mailto:jim.jeffers@emersonct.com>