

EPICS records with brief descriptions and names of the organization that developed or uses/used the record (or [BASE], if the record is in EPICS base 3.14.6, or [BASE313], if the record was in base 3.13.9 and is not in base 3.14.6). Some guesswork was involved in compiling this list. Not all of these records are currently maintained.

aai	array analog input [BASE]
aa0	array analog output [BASE]
ai	analog input [BASE] [REFMAN]
ao	analog output [BASE] [REFMAN]
bi	binary input [BASE] [REFMAN]
bo	binary output [BASE] [REFMAN]
calc	calculation [BASE] [REFMAN]
calcout	calculation and conditional output [BASE] [REFMAN]
compress	compress float values [BASE] [REFMAN]
dfanout	data fanout [BASE] [REFMAN]
eg	event-generator (custom hardware) [BASE]
egevent	event-generator (custom hardware) event [BASE]
er	event-receiver (custom hardware) [BASE]
erevent	event-receiver (custom hardware) event [BASE]
event	event [BASE] [REFMAN]
fanout	sequence of forward links [BASE] [REFMAN]
histogram	bin a series of PV values into an array [BASE] [REFMAN]
longin	integer input [BASE] [REFMAN]
longout	integer output [BASE] [REFMAN]
mbbiDirect	multi-bit binary input variant [BASE] [REFMAN]
mbbi	multi-bit binary input [BASE] [REFMAN]
mbboDirect	multi-bit binary output variant [BASE] [REFMAN]
mbbo	multi-bit binary output [BASE] [REFMAN]
permissive	for communicating state information [i.e., for handshaking] between a server and a channel-access client [BASE] [REFMAN]
sel	select a value based on criteria [BASE] [REFMAN]
seq	sequence of delay/read/write sets [BASE] [REFMAN]
state	string value for client-server, or client-client communication [BASE] [REFMAN]
stringin	string input [BASE] [REFMAN]

stringout        string output [BASE] [REFMAN]  
subArray        get part of an array [BASE] [REFMAN]  
sub              subroutine [BASE] [REFMAN]  
waveform        array [BASE] [REFMAN]

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Records not included in EPICS base 3.14.6  
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ab1771IFE        Allen Bradley [ANL - allenBradley]  
ab1771IX        Allen Bradley [ANL - allenBradley]  
ab1771N         Allen Bradley [ANL - allenBradley]  
ab1791          Allen Bradley [ANL - allenBradley]  
abDcm           Allen Bradley [ANL - allenBradley]  
aConcat         Join the several waveform into one. [KEK]  
aiTrip          ai with two additional fields: TLNK and TREN.  
                TLNK is a link that gets processed if a MAJOR severity condition  
                is reached. TREN is an enable/disable field for this link.  
                For software level trips to shut the beam off. [IPNS]  
apply           Part of Gemini Command/Action Layer between IOC's [OSL]  
aRaw            pick up every N element from waveform. [KEK]  
archive         store values of a PV for use by an EPICS archiving client [?]  
asyn            Generic interface to asyn port [ANL - asyn module]  
bates\_bpm       High-level control and processing for BPMs using Bates  
                flash-ADC board. Supports multiple sampling modes, trigger  
                delay, sample window width, two layers of sample averaging, RMS  
                and standard deviation, alarms, reference and delta values.  
                Heavily integrated with driver/device support. [Bates]  
beamh           beam history Module Control [ANL]  
beamhchan       beam history Module channel [ANL]  
beamLife        calculates storage ring beam lifetime [KEK]  
bigGenSub       based on gensub with the following differences: 47 inputs; 26  
                outputs; the user definable subroutines for initialization of  
                data size for each input and output have been eliminated [CFHT]  
biTrip          bi with two additional fields: TLNK and TREN.  
                TLNK is a link that gets processed if a MAJOR severity condition  
                is reached. TREN is an enable/disable field for this link.  
                For software level trips to shut the beam off. [IPNS]  
bpmKek          based on BPM record from JLAB [KEK]  
bpm             BPM with averaging, position calculations, and some user-

interface controls [ANL]

bpt Breakpoint table lookup record (like what is used in ai, but uses double rather than int for raw value). [Duke]

busy database interface to putNotify() - make a complex device useable by ca\_put\_callback() [synApps - sscan module]

cad Part of Gemini Command/Action Layer between IOC's [OSL]

camac Probes CAMAC [synApps - camac module]

car Part of Gemini Command/Action Layer between IOC's [OSL]

cm originally written to support the (custom) AT5 Diagnostic module, now a soft record - combination of calc with current-monitor trigger controls [ANL]

?command? command shaper [Keck]

compactsubarray copies entire waveform from its input record whenever it is processed. It means each subarray record will have a buffer to keep an input waveform. Requires small buffer which is large enough to keep an output waveform, which is usually much smaller than the input waveform. Unfortunately, you need to add a new database access routine in base. [KEK]

cpid CEBAF PID record [JLAB] [REFMAN]

cvt conversion record - Features 1 or 2 inputs (double), VAL = output (double). Conversion method selectable from linear, subroutine, 1d-table, 2d-table. On-line change of conversion method or table reload in the background without disruption of normal operation. Partly derived from ai and ao. No device support.

datalog for logging data arrays [ANL]

ddlypulse digital-delay pulse generator control [ANL]

ddlypulsevme digital-delay pulse generator control [ANL]

digitel For Digitel 500/1500 and new MPC vacuum controllers [ANL]

dxp XIA dxp custom [synApps - mca module]

ecdr814Board support for the ECDR-814 digital receiver board [SPEAR]  
ecdr814Channel  
ecdr814RX  
ecdr814

?encoder? custom encoder [Keck]

epid Enhanced PID record [synApps - std module]

fbuffer buffer record for floats [ANL]

findPeak find a peak in waveform, based on a compress record. [KEK]

genSub Multi-I/O subroutine, handles arrays [OSL - genSub module]

gp307 Vacuum gauge from Granville Philips [ANL]

gpib Probes GPIB [synApps - ip module]

hiv Access LeCroy or CAEN HV mainframes [JLAB]

image Intended to transfer a digitized image [i.e., 2D array of 1- or 2-byte integers] over channel access. [ANL]

interp General-purpose interpolation [KECK]

iq ai variant with hardware specific fields [ANL]

joinArray the opposite of a subArrayRecord. [SLS]

LongMbbiDirect Multi-bit binary reocrd for LONG(32bits) data. [KEK]

lseq long seq (16 outputs instead of 10) [JACH]

mbbi32Direct 32-bit version of mbbiDirect [ORNL - same as in base?]

mbbo32Direct 32-bit version of mbboDirect [ORNL - same as in base?]

mbbiTrip mbbi with two additional fields: TLNK and TREN. TLNK is a link that gets processed if a MAJOR severity condition is reached. TREN is an enable/disable field for this link. For software level trips to shut the beam off. [IPNS]

mca Supports multichannel analyzers [synApps - mca module]

memscan Memory Scanner Module Control [ANL]

mosub multiple-output sub (precursor to genSub) [OSL]

motor Replacement for stepper motor record - also supports servo motors; different device and driver support; user/dial coordinates; backlash takeout; encoders [synApps - motor module]

msbpm monitored BPM with averaging [ANL]

msbpmX monitored BPM with averaging [ANL]

nmr Hardware specific record for interface to NMR probes used for measuring magnet field. [Duke]

nslsdet For NSLS 384-element silicon detector, a derivative of the scaler record, with arrays to hold the counter data and per-element control info, and fields to control gain, shaping time and various diagnostic switches in the detectors. It is very specific to this hardware. [NSLS]

ornlAi AI for assignment to meters: percent field; two assignment fields; two scan rate fields [ORNL]

ornlAo AO for custom knob box: contains a percent field; knob gain field; saved value field; two fields to manage assignment to a knob; two scan rate fields - when assigned, SCAN is set to the fast rate; when deassigned, SCAN is set to the slow rate [ORNL]

ornlSub A modified sub record that adds a void pointer that may hold a structure allocated at init. The subroutine uses this to keep track of state info. [ORNL]

p2RfAim Arc Interlock Module

p2RfCfm Comb Filter Module

p2RfClk Clock Module  
 p2RfGvf Gap Voltage and Feed Forward Module  
 p2RfRfp RF Processing Module  
 One custom record per six custom RF VXI modules which are loaded with features and have very large address maps plus DSP interfaces - each record can be thought of as a combination of many ai/ao/bi/bo/sub/seq/waveform records where the bulk of the processing is done in device support. These records are monsters but I think new people assigned to maintain them come up to speed more quickly - it's easier to match the hardware documentation and address maps with the software. [SLAC/SPEAR]

pal Emulates PAL-type IC [BASE313]

pid Implements PID control algorithm [BASE313] [REFMAN]

ps For Bates integrated BitBus power supply controller. 1 DAC, 3 ADCs, DC control, interlock status/reset, ramping, cycling, many alarms. Set/read in Amps, kG, MeV for calibrated magnets [Bates]

pulseCounter Control hardware that counts pulses [BASE313]

pulseDelay Control hardware that generates a triggered pulse [BASE313]

pulseTrain generate a pulse train, or control hardware that does this [BASE313]

rf ai variant with hardware specific fields [ANL]

rt ramptable. Used to generate the ramps for the booster ramped power supplies. Works in conjunction with custom hardware. [ANL]

runcontrol a process that runs somewhere can register itself through this record, and for instance you could use it to avoid starting the same process twice in different machines. [ANL]

satRga Spectra Satallite RGA (now MKS) - Superset of vacScan. [ANL]

scaler Control a bank of counters [synApps - std module]

sCalcout string-calc-output (cf. calcout record) [synApps]

scan Programmatically set conditions and acquire data [BASE313]

scanparm scan parameters for sscan record [synApps - sscan module]

sddsLaunch ControlLaw Launch Record - used to start sdds epics tasks in the ioc [ANL]

serial Probes Serial (replaced by asyn) [synApps - ip module]

?servo? servo [Keck]

sir Part of Gemini Command/Action Layer between IOC's [OSL]

spectrum spectrum-analyzer - Calculate the one-dimensional FFT of a waveform. [ANL/LANL]

sscan Programmatically set conditions and acquire data (cf. scan record) [synApps - sscan module]

sseq string sequence (cf. seq record) - Execute a sequence of EPICS writes to a set of EPICS PVs; optionally, wait for completion after write. [synApps - std module]

sSub special subroutine, same as sub except with 26 inputs (A to Z) [SLAC/SPEAR]

status like 'longin' with forward links for each bit [ANL/ECT]

steppermotor First attempt at control for steppermotors [BASE313] [REFMAN]

strInMon just like a stringin, but produce a monitor every time a new string is received, EVEN IF IT IS THE SAME as the previous string. Greatly simplifies monitor driven control of string input systems. There's no need to write NULL's back into records so you will receive the next input (which create monitors themselves, that you have to handle!) [CFHT]

swait mostly superceded by calcout record. Evaluate a numeric expression; write the result to an EPICS PV; optionally wait for completion. [synApps - calc module]

swf scaled waveform record - same as waveform but with raw offset and vertical scale factor and offset. Used in reading scopes. [BESSY]

table Control a six-degree-of-freedom optical table [synApps - optics module]

timestamp Timestamp record, exports its timestamp as a string [SLAC]

timer Configure timing outputs of a pulse generator [BASE313] [REFMAN]

?trajectory? trajectory control [Keck]

transform Like 'calcout', but supports 16 sets of (inlink, expression, value, outlink), named \*A -- \*P, executed in order. Expressions can use the results of any previously evaluated expression in the record. [synApps - calc module]

tsub transform subroutine - a 'subroutine' record with lots of inputs and outputs [ANL/ECT]

ukpid PID servo [JACH]

vacScan Spectra VacScan RGA (MKS - pretty much obsolete) [ANL]

vme Probes VMEbus [synApps - vme module]

vxSymbol based on vme record. Can be replaced by symb lib. [KEK]

wait early version of calcout [BASE313] [REFMAN]

watchDog [KEK]

waveAnl waveform analysis - Compute simple statistics on a region of interest. [ANL/LANL]

waveout output waveform to a device. [KEK]

wfselector [KEK]

wftime waveform with both time and Y, assumes both are double, for

input waveforms only. PREC, EGU, HOPR, LOPR provided for both time and Y. ESLO and EOFF provided for Y. NORD monitor goes off when changed (unlike waveform which I think is a bug). Used in reading time/value arrays from Keithley DVMS. [SLAC/SPEAR]

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Links to entities named above:  
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[ANL] Argonne National Lab.; APS Accelerator Controls  
<http://www.aps.anl.gov/epics>

[ANL/ECT] Argonne National Lab.; Electronics and Computing Technologies  
(Division no longer exists)

[BASE] EPICS base 3.14.6  
<http://www.aps.anl.gov/epics>

[Bates] MIT Bates Linear Accelerator Center  
<http://mitbates.mit.edu/>

[BESSY] BESSY (Berlin synchrotron facility)  
<http://www-csr.bessy.de/control>

[CFHT] Canada-France-Hawaii Telescope  
<http://cfht.hawaii.edu/>

[Duke] Duke Free Electron Laser  
<http://www.fel.duke.edu/epics/>

[IPNS] Argonne National Lab.; Intense Pulsed Neutron Source  
<http://www.pns.anl.gov/computing/>

[JACH] Joint Astronomy Centre  
<http://www.jach.hawaii.edu/JACpublic/JAC/software/epics/>

[JLAB] Jefferson Lab.  
<http://www.jlab.org/accel/controls/controls.html>

[Keck] Keck Observatory  
<http://www2.keck.hawaii.edu:3636/realpublic/epics/>

[KEK] KEK, National Laboratory for High Energy Physics, Japan  
<http://www-acc.kek.jp/WWW-ACC-exp/KEKB/control/KEKB-Control-home.html>

[LANL] Los Alamos National Lab.  
<http://lansce.lanl.gov/lansce8/Epics/epics.htm>

[NSLS] National Synchrotron Light Source

[ORNL] Oak Ridge National Lab.; Spallation Neutron Source  
<http://ics-web1.sns.ornl.gov/>

[OSL] Observatory Sciences, Ltd.  
<http://www.observatorysciences.co.uk/epics.htm>

[SLAC] Stanford Linear Accelerator  
<http://www.slac.stanford.edu/comp/unix/package/epics>

[SLS] Swiss Light Source at the Paul Scherrer Institute  
<http://www.sls.psi.ch/controls/>

[SPEAR] Spear at SLAC  
<http://www.slac.stanford.edu/~spear/epics/>

[synApps] Argonne National Lab.; APS Beamline Controls  
<http://www.aps.anl.gov/aod/bcda/synApps>

=====  
CROSS REFERENCE  
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Records emulating notions from existing programming languages  
=====

scalar data type or simple structure  
-----

ai ao bi bo dfanout event longin longout sel  
aiTrip biTrip busy cvt ornlAi ornlAo timestamp vxSymbol

bit map  
-----

fanout mbbi mbbo mbbiDirect mbboDirect seq  
mbbi32Direct mbbo32Direct LongMbbiDirect mbbiTrip sseq status lseq

array data type (not including string)  
-----

aai aao compress cvt histogram subArray waveform  
aConcat aRaw bpt compactsubarray datalog genSub bigGenSub fbuffer  
findPeak image joinArray mca nslsdet rt scan spectrum sscan swf waveAnl  
waveout wfselector wftime

string data type  
-----

state stringin stringout  
asyn genSub bigGenSub gpib sCalcout serial sseq strInMon timestamp

array of variable (scalar) type  
-----

waveform subArray  
mca genSub bigGenSub swf

list  
-----

dfanout fanout sel seq  
sseq lseq sCalcout transform

indexed list  
-----

fanout sel seq  
sseq lseq sCalcout wfselector

event - software interrupt exception  
-----

eg egevent er erevent event permissive  
aiTrip biTrip mbbiTrip strInMon swait wait watchDog

algebraic/logical expression  
-----

calc calcout  
sCalcout swait transform wait

string expression  
-----

sCalcout

```

control structure (e.g. loop, switch, if-then)
-----
dfanout fanout sel seq calcout
lseq sseq scan sscan swait transform tsub

fixed algorithm
-----
ai ao compress histogram
aRaw beamLife bpt cpid cvt epid findPeak interp pid spectrum table
waveAnl

subroutine
-----
sub
cvt mosub genSub bigGenSub orn1Sub sSub tsub

semaphore/handshake
-----
permissive
busy runcontrol

menu (map integer to variable string)
-----
bi bo mbbi mbbo (and variants)

lookup table / array interpolation
-----
ai ao
bpt cvt interp

```

Records emulating notions from digital electronics  
=====

```

multiplexer/demultiplexer
-----
dfanout fanout sel seq calc calcout
lseq sCalcout sseq status transform wfselector

flip-flop, logic gate, ALU, etc.
-----
calc calcout
sCalcout swait transform wait

programmable logic
-----
pal

```

Records with special features  
=====

```

simulation mode
-----
ai aai ao aao bi bo event histogram longin longout mbbi
mbbiDirect mbbo mbboDirect stringin stringout waveform
mca swait

select mask
-----
fanout seq
lseq sseq

```

Records to connect with a named port device or service  
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asyn

Records specific to a hardware bus  
=====

gpib serial vme camac

Records specific to a hardware class  
=====

eg egevent er erevent  
ddlypulse hiv mca motor pulseCounter pulseDelay pulseTrain  
scaler servo stepper motor swf table timer trajectory wftime

Records specific to a particular piece or collection of hardware  
=====

ab\* bates\_bpm beamh beamhchan bpm bpmKek cm ddlypulsevme digital dxp  
ecdr814\* gp307 iq memscan msbpm nmr nslsdet p2\* ps rf rt satRGA vacScan